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Finding

Moore Gulch Timber Sale
Section 16, Township 5N, Range 2W

INTRODUCTION

The Montana Department of Natural Resources has proposed a timber harvest in the Moore Creek drainage located approximately 8 miles northwest of Ennis, Montana. The proposed harvest would remove an estimated 600-920 MBF of primarily Douglas fir sawlogs from approximately 45-75 acres of forested school trust lands.

The state ownership in this vicinity consists of a 640-acre section bordered on the north by the Beaverhead National Forest, on the west and southwest by BLM ownership and on the east and southeast by private land. There is an existing trail from the Granite Creek road across private and BLM lands to the sale area. However, portions of the road are not suitable for logging truck use and a new access road would need to be constructed. Temporary road use agreements are pending with the BLM, the USFS and the private landowner for access to the sale area.

This tract is classified grazing, valued principally for its grazing resources and is part of the land grant held by the State of Montana in trust for the support of the specific beneficiary, in this case common schools.

DECISIONS TO BE MADE

I have reviewed the Environmental Assessment prepared for the Moore Gulch Timber Sale specifically to:

1) Decide if an Environmental Assessment is the appropriate level of analysis or if an Environmental Impact Statement should be prepared.

2) Select an alternative to implement based on the information provided in the EA and a finding that an EIS is not necessary.

ALTERNATIVES UNDER CONSIDERATION

There were 5 alternatives considered in the EA, including the No Action Alternative. Two of the action alternatives would access the project area from the north across property administered by the Madison Ranger District and would require approximately .76 miles of new road construction on USFS ownership. The other two action alternatives would access the sale area from the west across BLM and private land and would require approximately .73 miles of new road construction. There are two harvest designs for each of the access alternatives. One would harvest an estimated 921 MBF from 7 units encompassing approximately 75 acres. The other would harvest in only 4 units and remove approximately 604 MBF from an estimated 45 acres.

ALTERNATIVE SELECTED

After reviewing the EA, comments received on the proposal and input received from resource specialists, I have decided to proceed with Alternative D: BLM Access with all Units (1-7). However I would prefer to modify the alternative to obliterate the existing road and instead leave the new road functional. The existing road is poorly located and has several steep grades that are eroding. Both roads would lead to the same ending location and are roughly equal in length; consequently the post harvest road densities would remain the same. The advantage is, the new road would be better located and have adequate drainage features installed to reduce erosion. Since the road is located on BLM and privat (Rice Ranch) land it is their administrative decision however and either one would be satisfactory.

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I have selected this alternative because I believe it can be implemented in a manner that is consistent with the long-term management of the tract while generating an estimated trust income of more than $157,000. The timber harvest will treat approximately 75 acres of forestland that is in an overstocked and under-productive due to inactive management. Harvest Alternatives utilizing the access route from the west across BLM and private lands was preferred by the Department of Fish, Wildlife and Parks (DFWP) wildlife biologist providing input on the sale proposal.

I have rejected the harvest alternatives accessing the sale area from the north across US Forest Service ownership due to the uncertainty of the USFS timber harvest plans and the DFWP biologist recommendation for the west access route due to elk security concerns.

I have rejected the BLM Access without harvesting units 5,6,7 due to the substantial loss of trust revenue that would be forfeited.

I have rejected the No Action Alternative because the timber harvest can be conducted in a manner consistent with the State Forest Land Management Plan, existing uses of the tract and surrounding lands while producing trust revenue and other long term management benefits.

SIGNIFICANCE OF IMPACTS

Based on my review of the information provided in the EA, the project file and an on site review, I conclude that significant impacts would not occur as a result of implementing the selected alternative. Therefore an Environmental Impact Statement will not be prepared. I base this decision on the following considerations:

Water Quality, Water Yield and Soils: Proposed harvest units and roads have been located by design to avoid active stream channels and unstable soils. All harvest unit boundaries are located outside streamside management zones. There are no active stream channel crossings proposed during road construction. All newly constructed roads will be closed and seeded to rapidly reestablish vegetative cover. Best Management Practices for Forestry will be implemented to substantially reduce the potential for impacts to water quality and soils. A cumulative effects analysis indicates increases to water yield as a result of the proposed activities are very unlikely to occur due to the open range-like nature of the watershed, minor amount of timber harvest activity that has occurred in the past 15 years and lack of evidence of stream instability from increases in peak flows. The current and proposed harvest levels would be well below what is normally associated with detrimental water yield increases.

Impacts to Elk and Deer Winter Range: Although some winter elk and deer use of the project area occurs, it likely does not normally receive use by large numbers or for extended periods of time. The Montana Department of Fish, Wildlife and Parks has identified "key" winter areas that are used year after year or during harsh or extreme winter events. The nearest identified winter range is more than two miles from the project area.

Elk Security and Vulnerability: The extent of seasonal elk use in the project area is unknown. However, observed low utilization of preferred vegetation and relatively low abundance of pellet groups in the area indicate the project area does not receive use by substantial numbers of elk. Approximately 430 acres of the 640-acre state ownership is open grassland. Forested habitat in the sale area is comprised of small fragmented patches mostly between 10 and 30 acres in size (largest patch is 50 acres) and is located less than ½ mile from open roads or jeep trails. Consequently, these forested patches are not of sufficient size or located a sufficient distance from open roads to be considered as security cover for elk. Security cover is generally defined as those forested stands greater than 200 acres in size and more than ½ mile from an open road and allow elk to remain in an area during periods of increased stress or disturbance. The proposed activities, therefore, will not affect security cover in the Tobacco Roots Elk Management unit. Elk however may use the project area during the hunting season and benefit for brief periods from the hiding

cover provided by these forested stands. The selected alternative would remove approximately 75 acres of hiding cover from the 210 acres of forest cover in the project area. This reduction in hiding cover may result in a moderate increase in elk vulnerability in the immediate area and a minor cumulative reduction in the Tobacco Roots but is not likely to be discernable at the Hunting District or Elk Management Unit scale or affect the Department of Fish, Wildlife and Parks' ability to meet their elk management goals.

Threatened, Endangered and Sensitive Species: There is no documented use, nor is there appropriate habitat within the project area for any Threatened or Endangered Species. The DNRC maintains a list of sensitive species for which a fine filter habitat analysis is conducted on proposed forest management projects. The sensitive species list includes: flammulated owl, boreal owl, black-backed woodpecker, pileated woodpecker, northern bog lemming, harlequin duck, ferruginous hawk, mountain plover, peregrine falcon, and Townsend's big-eared bat. There is no documented use, nor is there appropriate habitat at present within the project area for any of the sensitive species.

Old growth: There are no old growth stands greater than five acres in the project area. There are however, scattered old relic trees and clumps of old Douglas fir trees on ridge tops and in areas that were protected from fires that were historically common in the area. Relic trees, snags and downed woody debris, although uncommon, will be retained wherever a safety hazard is not a factor.

EXECUTION

Upon execution, this Finding becomes part of the Final Environmental Assessment for the Moore Gulch Timber Sale.

Signed _____ 7/17/00

Garry Williams
Forest and Lands Manager
Central Land Office

MOORE GULCH TIMBER SALE PROPOSAL
ENVIRONMENTAL ASSESSMENT

SECTION 16, T5N - R2W

DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

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June 29, 2000

COMPILED BY: CURT TESMER, BOZEMAN UNIT FORESTER

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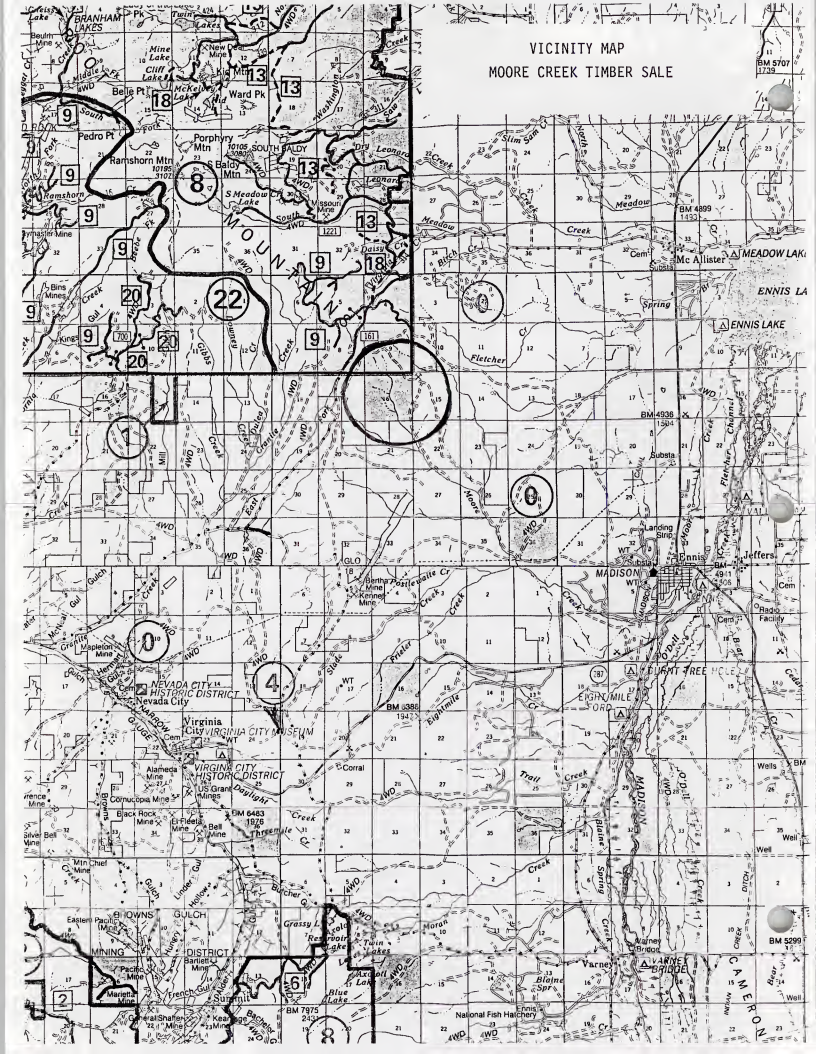

VICINITY MAP
MOORE CREEK TIMBER SALE
BRANHAM LAKES
Belle Pt
Ward Pk
Pedro Pt
Porphyry Mtn
10105 SOUTH BALDY
Ramshorn Mtn
10192
Baldy Mtn
S Meadow Lake
Missouri Mtn
MOUNTAIN
Mc Allister
MEADOW LAKE
ENNIS LAKE
Ennis
Jeffers
MADISON
EIGHT MILE
Virginia City
VIRGINIA CITY HISTORIC DISTRICT
Nevada City
BROWNS GULCH
MINING DISTRICT
Varney
VARNEY BRIDGE
CAMERON
Blue Lake
National Fish Hatchery
BM 5707
BM 4899
BM 4936
BM 5299
BM 7975

CHAPTER I – PURPOSE/MANAGEMENT OBJECTIVES

A. Purpose

The Montana Department of Natural Resources and Conservation (DNRC) proposes to initiate forest management and timber harvesting on state school trust lands in the Moore Creek area. The Moore Gulch Timber Sale proposal is located in Section 16, T5S – R2W, which is located 6 air miles northwest of Ennis, Montana, in Madison County.

The project proposal would address the management of Douglas fir and lodgepole pine timber contained within 5-7 units encompassing approximately 45-75 total acres. The estimated harvest volume would be 604-921 thousand board feet, depending upon the alternative selected. Up to 2.0 miles of temporary minimum standard road would need to be constructed on the State ownership. Access to the State section would require the crossing of either U S Forest Service or Bureau of Land Management and private lands, and involve the construction of up to 1.0 mile of new temporary road. The proposed action could begin during the fall months of 2000 and likely conclude by October 2003.

B. Project Need

The lands involved in this proposed project are held by the State of Montana in the trust for the support of specific beneficiary institutions such as public schools, state colleges and universities, and other specific state institutions such as the school for the deaf and blind (Enabling Act of February 22, 1889, 1972 Montana Constitution, Article X, Section 11). The Board of Land Commissioners and the Department of Natural Resources and Conservation are required by law to administer these lands to produce the largest measure of reasonable and legitimate return over the long run for these beneficiary institutions (Section 77-1-202, MCA). On May 30, 1996, the Department released the Record of Decision on the State Forest Land Management Plan (SFLMP). The Land Board approved the SFLMP's implementation on June 17, 1996. The SFLMP outlines the management philosophy of the DNRC in the management of the state forested lands, as well as sets out specific Resource Management Standards (RMS) for ten resource categories.

The Department will manage the lands involved in this project according

to the philosophy and standards in the SFLMP, which states;

> "Our premise is that the best way to produce long-term income for the trust is to manage intensively for healthy and biologically diverse forests. Our understanding is that a diverse forest is a stable forest that will produce the most reliable and highest long-term revenue stream...In the foreseeable future, timber management will continue to be our primary source of revenue and our primary tool to achieving biodiversity objectives."

C. *Project Objectives*

In order to meet the goals of the State Forest Land Management Plan, the Department has set the following project objectives:

1. Generate revenue for the school trust through the harvest of timber from the project area.
2. Promote a diversity of stand structures and patterns for a long-term sustainable forest.
3. Maintain a semblance of historic forest conditions.
4. Maintain other current uses.

D. *Relationship to the State Forest Land Management Plan*

In June 1996, DNRC began a phased-in implementation of the SFLMP which established the agency's philosophy for the management of forested state trust lands. The management direction provided in the SFLMP comprises the framework within which specific project planning and activities take place.

The SFLMP also defines the RMS's which guided the planning of this proposed action. The SFLMP philosophy and appropriate RMS's have been incorporated into the design of the proposed action.

E. *Other Environmental Reviews Related to the Project*

Tobacco Root Vegetation Treatment Environmental Assessment, USFS, Madison Ranger District, Decision Notice/Finding of No Significant Impact dated May 13, 1997 – Decisions made to treat vegetation in the southern Tobacco Root Mountains and to amend the Forest Plan were challenged by a lawsuit in January, 1998. The Draft Environmental Impact Statement

(DEIS) was distributed in April 1999 with comments due by June 1, 1999. Comment period was extended with an expected signature date of April 28, 2000. Due to the required comment period and possible appeals period the process of adopting this Plan document may be extend through June or July of 2000.

Moore Creek Timber Sale/USFS – Madison Ranger District has a timber sale proposed for Section 9, T5S- R2W, directly north of the state ownership. This project consists of harvesting approximately 1.580 MMbf from an estimated 558 acres. Approximately 4 miles of temporary road would be associated with the project. Type of harvest is focused on removing 1/3 of the basal area from below (understory removal)/selective harvest of Douglas-fir (60%) and lodgepole pine (40%), followed by underburning. No specific Environmental Assessment for the project has been issued since all actions in the Tobacco Roots are pending the approval of the Tobacco Root Vegetative Management Plan (1999).

Dillon Unit/DNRC has initiated scoping of the Browns/Granite Timber Sale proposal. The project proposal includes two school trust land parcels, Section 16, T7S-R3W (Browns/Barton Gulch) and Section 36, T5S-R3W (Granite Creek). The Browns/Barton Gulch parcel is located approximately 14 air miles southwest of the Project area and approximately 1.2 MMbf of Douglas-fir, lodgepole pine, Engelmann Spruce and Subalpine Fir is proposed for harvest treatment from approximately 250 acres of State of Montana ownership. Up to approximately 3 miles of road reconstruction and 3.2 miles of new construction would be needed to complete the proposed project.

The Granite Creek portion of the proposed project (Section 36, T5S-R3W) is located 3.5 air miles southwest of the Moore Gulch Timber Sale proposal. The Granite Creek proposal consists of harvesting approximately 200-250 Mbf from an estimated 50 acres. Up to 2.5 miles of road would be required for access to this project.

F. Agencies with Jurisdiction

There are two possible access routes to the proposed project that require road use permits from either the BLM or USFS. The first route, used in two of the proposed alternatives, would require new road construction across the USFS ownership located to the north of the State parcel. Correspondence has been submitted to the Madison Ranger District (Petroni,10/15/98) for a Road Use Permit to access the State ownership and to use the South Meadow Creek USFS road as a main haul route. Follow-up correspondence was submitted on 8/12/99 and 12/7/99. The

permit is pending USFS review.

The second route would require new road construction on the BLM ownership in Section 17, west of the State parcel. A Road Use Application was submitted to the BLM on August 12, 1999, with a follow-up response received dated October 28, 1999. The permit is pending the decision maker's review of the road access alternatives in this EA and approval of the Permit Application by the BLM.

Access from the west will also require a temporary road use agreement for a small segment of road on private land. The private party has been contacted and a temporary agreement is pending the selection of a preferred route.

Any activity which disturbs the naturally occurring vegetation is subject to review by the local County Weed Board. The DNRC has a Revegetative and Weed Management Plan on file with the County Weed Board. If an Action alternative is selected, the DNRC would file a site specific Weed Management Plan with the Weed Board.

The activity of burning slash would involve two agencies. Madison surface vegetation falls under County jurisdiction, which usually requires parties to obtain a burning permit. The Department of Environmental Quality regulates air quality. DNRC is a participant in the Montana Air Shed Coordinating Group planning effort to limit particulate production.

G. *The Decision To Be Made*

There are two decisions that need to be made regarding these alternative proposals.

The first is to decide which management alternative would best meet the management objectives and the objectives of the SFLMP.

The second decision is whether this Environmental Assessment adequately identifies the potential impacts of the selected alternative and the potential for those impacts to be significant.

H. Initial Scoping and Public Involvement

The public involvement process began with the publication of a Legal Notice in the Bozeman Chronicle on October 18 and 22, 1998. Individual scoping notices were sent to the following during the period of October 15 – 21, 1998.

Greater Yellowstone Coalition, Bozeman, MT.
Mt. Chapter of American Fisheries, Bozeman, MT.
Louisiana Pacific Corporation, Belgrade, MT.
R-Y Timber Inc., Townsend and Livingston, MT.
Alliance for the Wild Rockies, Bozeman, MT.
Alliance for the Wild Rockies, Missoula, MT.
U S Department of Interior, BLM, Dillon, MT.
USFS – Madison Ranger District, Ennis, MT.
Mt. Wood Products Association, Helena, MT.
Tribal Historic Preservation Office, Pablo, MT.
Gilman I H Cattle, Lessee, Alder, MT.
Rice Ranches, Adjacent Landowner, Harrison, MT.
Tony Schoonen, Ramsay, MT.
Stuart Lewin, Great Falls, MT.
Mt. Eastside Forest Practices Comm., Bozeman,
MT Ecology Center, Missoula, MT.
Plum Creek Timber Co., Columbia Falls, MT.
F H Stoltze Land & Lbr. Columbia Falls, MT.
Friends of the Wild Swan, Swan Lake, MT.
Montana Department of Fish, Wildlife and Parks,Wildlife Biologist, Bozeman, MT.
DNRC Environmental Impact Specialist, P. Rennie
DNRC Soil Scientist, J. Collins
DNRC Hydrologist, G. Mathieus
DNRC Forest Planner, T. Schultz
DNRC/Ag & Grazing Mgmt. Bureau, K. Chappell
DNRC Wildlife Biologist, R. Baty

I. Resource Concerns

Responses were received from the DNRC Specialists, Montana Fish, Wildlife and Parks, and the Ecology Center/Alliance for the Wild Rockies.

The following environmental issues were compiled for this proposed project effects analysis.

- Water Quality, Water Yeild and Soils

- Big Game Winter Range, Elk Security and Vulnerability
- Threatened, Endangered and Sensitive Species

J. Issues

1. Water Quality, Water Yield and Soils

There is a concern that a reduction in timber cover, new road construction and log skidding activities may adversely affect water quantity (water yield, channel stability), water quality (physical or chemical attributes), site conditions (soil loss from erosion, soil nutrient losses) and fisheries.

Timber harvest and road construction may impact water quality primarily by accelerating sediment delivery above natural levels to local stream channels and draw bottoms. These impacts could result from erosion from road surfaces, skid trails, log landings and by the removal of vegetation along stream channels. Newly constructed and existing roads with inadequate drainage features (not meeting BMPs) could increase sediment delivery to local stream channels and draw bottoms.

Cumulative watershed effects can be characterized as impacts on water quality and quantity that result from the interaction of disturbances, both human-caused and natural. Timber harvest activities may affect the timing of runoff, increase sediment yields, increase peak flows and increase the total annual water yield of the drainages.

Equipment operations during timber harvest on wet sites or sensitive soils may result in soil impacts that may affect soil productivity. Impacts can vary depending on area and degree of physical effects, amount and distribution of coarse woody debris retained for nutrient cycling.

Timber harvest and road construction activities may impact fish habitat primarily by increasing water temperatures, accelerating sediment delivery above natural levels to local stream channels and by decreasing large woody debris and shade cover through the removal of recruitable trees near the stream channel.

2. Big Game Winter Range, Elk Security and Vulnerability

   There is a concern that removal of timber could reduce cover important for the survival of wintering elk and mule deer that use the project area. Also that the proposed harvest of timber and road construction may reduce elk security cover and increase hunter access. This may increase the number of bull elk harvested during the first week of the hunting season, and that may subsequently require the MDFWP to further restrict hunter opportunity in the area. Concern also focuses on existing effects of low security cover associated with previous logging activities on federal and private ownerships in Hunting District 320.

3. Threatened, Endangered and Sensitive Species

   There are several wildlife species identified as "sensitive" by the DNRC that may use the Tobacco Root Mountain vicinity and surrounding area. There is a concern that the proposed actions may have unacceptable impacts to these species as well as any sensitive plant species that may be in the vicinity.

These issues and other resource concerns will be addressed in further detail in Chapters III and IV of this document.

CHAPTER II - ALTERNATIVES

A. Introduction

This chapter explains how the alternatives were developed, and describes the No-Action alternative, various action alternatives, and the alternatives that were considered but not given detailed study and dismissed.

B. Development of Alternatives

Some of the issues identified above led to the development of mitigation measures that can be incorporated into all alternatives. Others become the primary concern for developing an alternative.

A traditional ground skidding alternative is being considered for all action alternatives since the terrain is suitable for a ground based system.

The No Action Alternative is evaluated as the basis for comparing the other alternatives to the option of not conducting the project.

C. Description of Alternatives

1. Mitigation Measures Common To All Action Alternatives

   a. All new road construction is designed to meet minimum standard specifications.

   b. At the end of the project, most new road construction on the State of Montana ownership is to be physically closed at designated locations so they are impassable to motorized vehicles. Logging slash and brush will be the used when available to discourage foot traffic along the right-of-way, then seeded with weed free grass seed.

   c. New road construction on private or other agency (USFS or BLM) is expected to be made impassable through obliteration/recontouring. This type of road closure will depend on which access route is granted and the specific conditions established in the Road Use Agreements.

d. All road reconditioning would strive to bring the existing haul routes up to BMP standards. The reconditioning would consist of minor blading and reshaping road drainage improvements where needed to reduce potential sedimentation problems.

e. The access route through private land would be and acquired for the sole purpose of implementing this proposal and is not designated for public access purposes.

f. The timber sale agreement will require any damaged improvement to be repaired or replaced.

g. Soil scarification will be kept to a minimum to limit potential noxious weed, soil and watershed impacts and meet silvicultural goals. Scarification is expected to range from 20 to 40%.

h. Retention and distribution of at least 10 tons and up to 20 tons per acre of woody debris greater that 3" in diameter is planned for nutrient recycling and soil wood recruitment. This measure is meant to maintain soil productivity, seedling micro-climate, habitat for some species of small mammals, and old growth stand characteristics.

i. Road construction will be minimized and located on the most stable ground feasible. All proposed road construction will be reviewed by the soil scientist for site specific mitigation designed to maintain slope stability.

j. Road use and equipment operations during the harvest and post harvest activities will be limited to dry, frozen or snow covered ground conditions.

k. Road drainage features will be installed concurrent with the construction and will be maintained throughout the course of the project.

l. To minimize compaction and soil displacement, slash disposal methods would be limited to spot piling, whole tree skidding, lopping and scattering, and possibly jackpot burning.

m. All newly disturbed soils on road cuts and fills and recontouring measures would be promptly reseeded to site adapted grasses to reduce weed encroachment and stabilize roads from erosion.

n. To discourage introduction of weeds, all off road equipment used in the sale area would be power washed and inspected prior to being brought on site.

o. DNRC would monitor the project area for two years after the completion of the harvest activities to identify if noxious weeds occur on the site. Money will be collected from the purchaser of the sale for the treatment of noxious weeds. If noxious weeds do occur, a weed treatment plan will be developed and implemented.

p. All current Forestry Best Management Practices (BMP's) would be implemented as they pertain to all action alternatives in the Environmental Assessment.

q. All current Streamside Management Zone (SMZ) Laws and procedures would be followed as they pertain to all action alternatives. No harvest is planned to occur within the SMZ's on the project area.

r. If cultural resources, sensitive species, or threatened or endangered species are found in the area, the project would be suspended, pending further analysis by the appropriate resource specialist.

s. Snags will be retained to the fullest extent possible as long as they do not jeopardize safety on the site.

t. Under all alternatives described licensed grazing and non-motorized recreational activities would continue within the State of Montana section.

2. Alternatives Considered In Detail

There are 5 alternatives under consideration, including a no action alternative. Two alternatives are distinguished by an access route entering from the north, across US Forest Service ownership. The other two action alternatives would use an access route from the

west across BLM ownership.

a. Alternative A – No Action

This No Action alternative would not allow timber harvest, new road construction or road improvement activities. No revenue would be generated from timber harvest treatments. Revenue from licensed grazing and recreational activities would continue.

b. Alternative B – USFS Access With All Units (1-7)

This alternative is similar to the initial proposal that was distributed in the scoping notice (6-7 units; 70-100 acres; 1.9 miles of new road construction on State and 0.9 of a mile on USFS). The figures associated with the original proposal have been revised based on field measurements and data collected in the process of refining the proposed project.

Under this alternative, DNRC would harvest an estimated 921 Mbf of timber from approximately 75 acres. The harvest would include 7 units ranging in size from 3 to 18 acres. An estimated 70-75% of the merchantable volume would be removed from the units under primarily an individual leave tree or group selection treatment. The primary species removed would be Douglas fir except in unit 7, where the dominant species is lodgepole pine. An estimated 2.7 miles of temporary new road would be constructed. Approximately 0.3 miles of existing USFS road would receive minor surface and drainage improvements prior to use. Unless otherwise identified per the pending road use agreement, all new road on the USFS would require obliteration through recontouring and seeding. Road closure on the state ownership would consist of debris and slash placement and seeding. This closure process would result in no net increase of open roads in the area.

c. Alternative C – USFS Access Without Units 5, 6 & 7

This alternative was developed in response to concerns relating to elk security and habitat management strategies.

Under this alternative, DNRC would harvest an estimated 604 Mbf of timber from approximately 45 acres. The harvest would include 4 units ranging from 3 to 18 acres. An estimated 2.1 miles of temporary new road would be constructed. Approximately 0.3 miles of existing USFS road would receive minor surface and drainage improvements prior to use. Unless otherwise identified per the pending road use agreement, all new road on the USFS would require obliteration through recontouring and seeding. Road closure on the state ownership would consist of debris and slash placement and seeding. This closure process would result in no net increase of open roads in the area.

d. Alternative D – BLM Access With All Units (1-7)

This alternative uses the alternate access route from the west, across BLM and private lands. The proposed harvest is the same as in Alternative B.

Under this alternative, DNRC would harvest an estimated 921 Mbf of timber from approximately 75 acres. The harvest would include 7 units ranging in size from 3 to 18 acres. Approximately 2.9 miles of temporary new road would be constructed. Approximately 0.2 mile of existing private road would receive minor surface and drainage improvements prior to use. A temporary culvert would be installed in the SE NE SE of Section 17, T5S-R2W. The culvert would be removed and the area restored upon completion of hauling. Unless otherwise identified per the pending road use agreement, all new road on the BLM would require obliteration through recontouring

and seeding. Road closure on the private and state ownership would consist of debris and slash placement and seeding. This closure process would result in no net increase of open roads in the area.

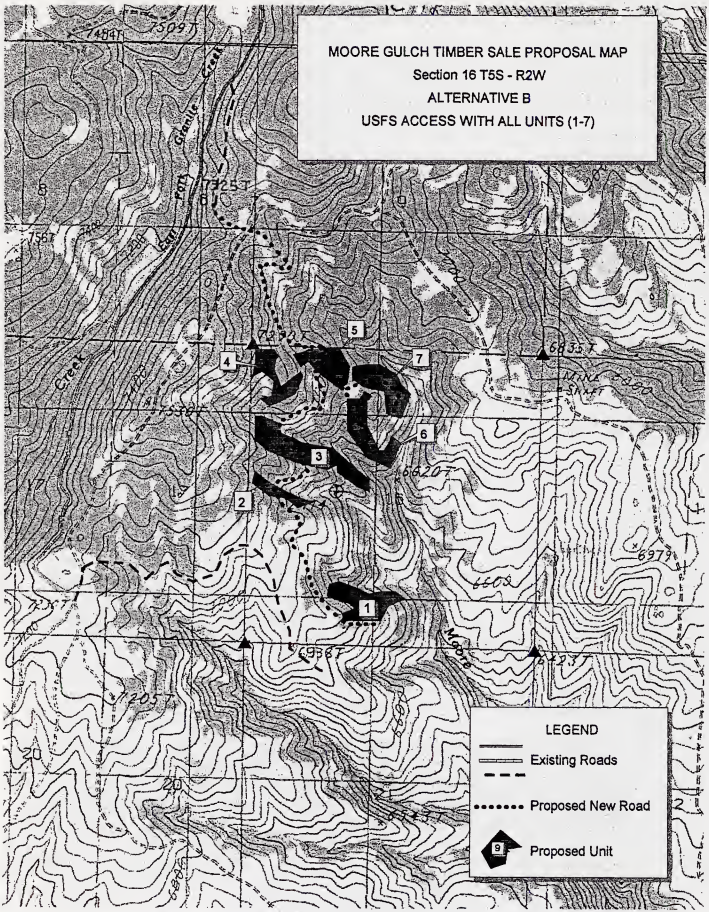
e. Alternative E – BLM Access Without Units 5, 6 & 7

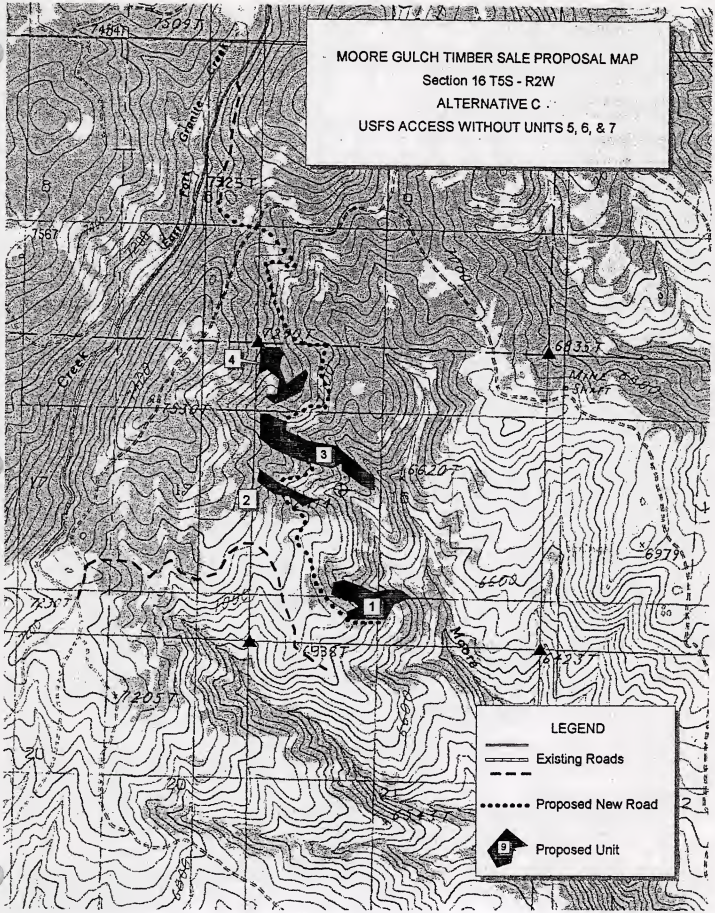
This alternative uses the alternate access route from the west, across BLM and private lands. The proposed harvest is the same as in Alternative C, and was developed in response to concerns relating to elk security and habitat management strategies.

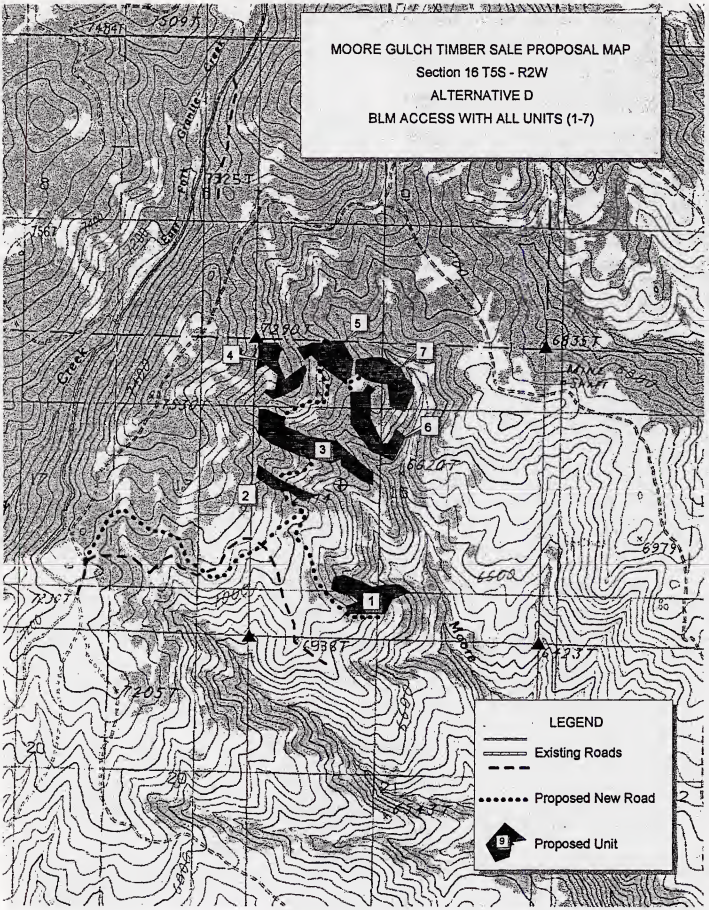
Under this alternative, DNRC would harvest an estimated 604 Mbf of timber from approximately 45 acres. The harvest would include 4 units ranging from 3 to 18 acres. An estimated 2.2 miles of temporary new road would be constructed. Approximately 0.2 mile of existing private road would receive minor surface and drainage improvements prior to use. A temporary culvert would be installed in the SE NE SE of Section 17, T5S-R2W. The culvert would be removed and the area restored upon completion of hauling. Unless otherwise identified per the pending road use agreement, all new road on the BLM would require obliteration through recontouring and seeding. Road closure on the private and state ownership would consist of debris and slash placement and seeding. This closure process would result in no net increase of open roads in the area.

3. Alternatives Considered but Dismissed

During the preliminary stages of developing the proposed action, an access route using the existing unimproved, two track road in Section 17 was considered. The DNRC soils specialist and the BLM representative determined that the existing road was not suitable for use due to problems associated with maintaining drainage on excessive grades.


MOORE GULCH TIMBER SALE PROPOSAL MAP
Section 16 T5S - R2W
ALTERNATIVE B
USFS ACCESS WITH ALL UNITS (1-7)
LEGEND
Existing Roads
Proposed New Road
Proposed Unit
1
2
3
4
5
6
7
Moore Gulch
Granite Creek
MINA SHAFT


MOORE GULCH TIMBER SALE PROPOSAL MAP
Section 16 T5S - R2W
ALTERNATIVE C
USFS ACCESS WITHOUT UNITS 5, 6, & 7
LEGEND
Existing Roads
Proposed New Road
Proposed Unit
1
2
3
4
Moore Gulch
Stanley Creek
Piper Fork
Hine Creek
7325T
7567
6935T
6979
6205T


MOORE GULCH TIMBER SALE PROPOSAL MAP
Section 16 T5S - R2W
ALTERNATIVE D
BLM ACCESS WITH ALL UNITS (1-7)
LEGEND
Existing Roads
Proposed New Road
Proposed Unit
1
2
3
4
5
6
7
9
7509T
7325T
7290T
6835T
6979
6936T
7205T
Granite Creek
Moore Gulch
Mine Shaft

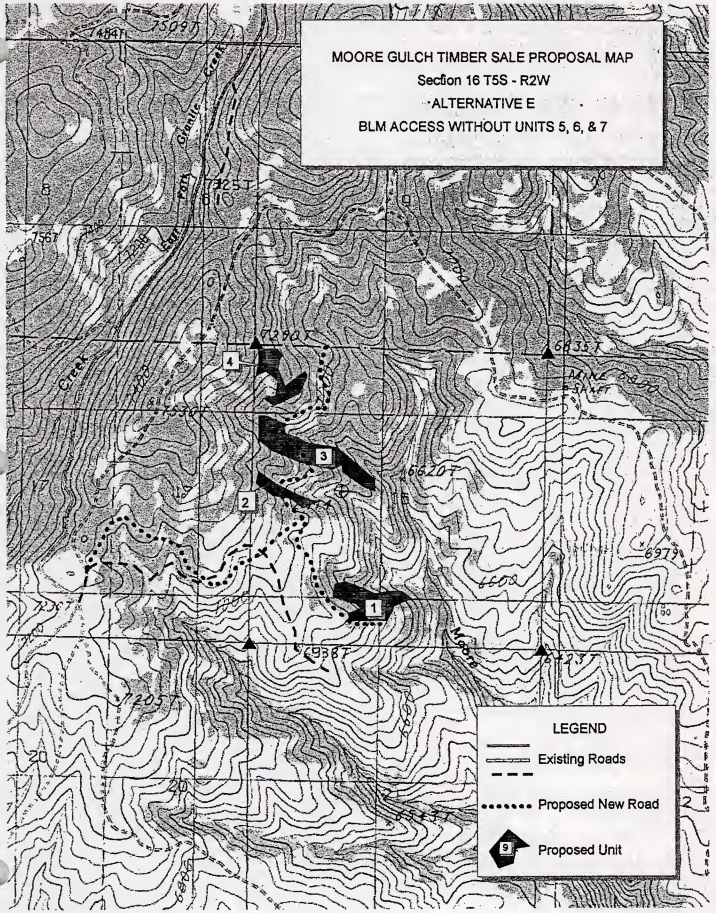

MOORE GULCH TIMBER SALE PROPOSAL MAP
Section 16 T5S - R2W
ALTERNATIVE E
BLM ACCESS WITHOUT UNITS 5, 6, & 7
LEGEND
Existing Roads
Proposed New Road
Proposed Unit
1
2
3
4
Granite Creek
Moore Gulch
MINE SHAFF
7390T
6935T
6620T
6973T
6600
6938T
6533T
7205T
6437T
7325T
7567
7484T
7509T

TABLE II - 1 - SUMMARY OF TREATMENTS BY HARVEST UNIT

UNIT #	ACRES	SPECIES NET VOLUME MBF	ESTIMATED % HARVEST VOLUME	TYPE OF HARVEST	ESTIMATED LEAVE TREE VOLUME MBF	ESTIMATED HARVEST VOLUME MBF
1	13	DF-202	80%	CLUMP/ MOSAIC	40	162
2	3	DF-48	100%	CLEARCUT	0	48
3	18	DF-316	75%	SEED TREE/ CLUMP	79	237
4	11	DF-224	70%	SEED TREE/ CLUMP	67	157
5	9	DF-115	70%	SEED TREE/ CLUMP	34	80
6	11	DF-181	70%	SEED TREE/ CLUMP	54	127
7	10	DF-79. LPP-55	DF-70% LPP-ALL	SEED TREE/ SPECIES CUT	26	110
TOTALS	75 ACRES	1220 MBF	AVE % HARVEST = 76%		298 MBF	921 MBF

Table II-2: Summary of Alternatives and Effects

INDEX OF MEASURE	ALT A NO ACTION	ALT B	ALT C	ALT D	ALT E
Estimated Harvest Acres	0 acres	75 acres	45 acres	75 acres	45 acres
Estimated Harvest Volume	0	921 Mbf	604 Mbf	921 Mbf	604 Mbf
Number of Harvest Units	0	7 units	4 units	7 units	4 units
New Construction Permanent	0 miles	New road construction to be closed on USFS/BLM through obliteration/recontouring. New roads on private and State to be closed through debris placement and seeding.			
New Construction Temporary	0 miles	2.7 miles	2.0 miles	2.9 miles	2.2 miles

Proposed Activity or Environmental Component	Alternative A No Action	Alternative B USFS - All Units	Alternative C USFS - Units 1-4	Alternative D BLM - All Units	Alternative E BLM - Units 1-4
Impacts on Vegetation					
Cover Types	Very gradual increase of shade tolerant species	75 acres of Douglas-fir cover type removed with a mosaic pattern-36% of forested area	45 acres of Douglas-fir cover type removed with a mosaic pattern-21% of forested area	75 acres of Douglas-fir cover type removed with a mosaic pattern-36% of forested area	75 acres of Douglas-fir cover type removed with a mosaic pattern-21% of forested area
Successional Stages	Slow trend toward climax. Forests remain older than would be expected	75 acres of Douglas-fir converted to seedling stage	45 acres of Douglas-fir converted to seedling stage	75 acres of Douglas-fir converted to seedling stage	45 acres of Douglas-fir converted to seedling stage
Old Growth	Gradual trend of all forested acres to approach old growth conditions	No old growth stands exist within the Section; no impacts anticipated.			
Insect and Disease	Potential mortality from insect and disease infestations expected to slowly increase as stands increase in age	Reduction of susceptibility to spruce budworm on the treated acres of Douglas-fir			
Sensitive Plants	No impacts anticipated				

Noxious Weeds	Weeds may establish presence on existing 4x4 roads	Integrated Weed Management Plan to develop a prevention and monitoring plan to address potential introduction of weeds on site. Includes power washing equipment, reseeding disturbed sites and a two year monitoring period for detection and control			
Impacts to Watershed and Soils					
Water Yield	No increase in water yield	No detectable increases in water yield anticipated			
Sedimentation	Minimal impacts anticipated				
Fisheries	Minimal impacts anticipated				
Soils	Implementation of mitigation will minimize impacts and maintain long term productivity.				
Impacts to Wildlife					
Elk Security	No Immediate change	Minimal impact to Elk Security anticipated.			
Big Game Winter Range	No impacts	Moderate effect	Low Effect	Moderate effect	Low effect

Elk Vulnerability (relative to Section 16 baseline)	No increase with DNRC No Action. Moderate increase with USFS action.	Low to moderate increase w/o USFS action. High with USFS action.	Low increase w/o USFS action. Moderate to high with USFS action.	Low to moderate increase w/o USFS action. High with USFS action.	Low increase w/o USFS action. Moderate to high with USFS action.
T and E Species	No Impacts	No effects associated with this project proposal are anticipated on any of the Threatened and Endangered species listed for the Central Land Office area.			
Flammulated Owl	Minor adverse impacts due to development of dense Douglas-fir stands.	Proposed treatments would retain most of the old, relic trees and create small openings within the dense stands, which would create an expected increase for future use of the area by owls. Proposed harvest would treat a minor number of acres, but would provide cumulative benefit for flammulated owls.			
Black-Backed Woodpecker	No impacts	Harvest activities associated with this project would reduce the density of the existing mature stands that are becoming increasingly prone to insect and intense fire events. This reduced tree density would result in a minor cumulative decrease in the acreage of future, potential black-backed woodpecker habitat.			
Ferruginous Hawk	No impacts	No impacts to ferruginous hawks are expected to occur as a result of this project. However, should any ground-nesting hawks be observed within 400 meters of the proposed haul routes or active harvest units, harvest activities would cease and the DNRC biologist would be contacted for implementation of site-specific mitigation measures.			

CHAPTER III - AFFECTED ENVIRONMENT

A. Introduction

This chapter presents the aspects of the affected environment which are relevant to the issues identified in Chapter II.

B. Background

1. Forest Vegetation

Forested stands proposed for treatment occur in foothills and lie within a grassland-forest ecotone. Stands are generally dominated by Douglas-fir and include scattered trees and patches of lodgepole pine, Rocky Mountain juniper, Englemann spruce and aspen. Aspen encountered were generally <8" dbh. Forested stands are <150 years of age containing a few scattered old trees and clumps. Old tree clumps (>150 years) primarily occur on ridge tops where fire intensity is typically low. Two Douglas-fir trees were bored for age in harvest unit 5. One was 16" dbh (~110 years old) and one was 18" dbh (~130 years old). Coarse woody debris (CWD) is primarily comprised of small diameter material (<12"dbh) and ranges from ~5-15 tons per acre (ocular estimation). Large snags (>21" dbh) are rare, however, small snags (<12" dbh) are relatively abundant (~5/acre). Both CWD and snags tend to be concentrated within densely stocked patches of even-aged Douglas-fir. Mature stands (>100 years old) tend to be single storied.

A dense young component of Douglas-fir is establishing along the edges of mature forest into areas that were likely non-forested grasslands around the turn of the century. Natural regeneration appears to take considerable time to obtain across much of the project area (~10-20 years), however, once trees reach sapling size they appear to grow very quickly (judged from radial growth observed from tree cores). Forest understory species included: common juniper, chokecherry, snowberry, grouse whortleberry, spiraea, Oregon grape, twisted stalk, penstemon spp., wild strawberry, lupine spp., mint, common yarrow, low larkspur, Indian paintbrush, arnica, death camas, pussy-toes, western meadowrue, pine grass, elk sedge.

Plant species found in adjacent grassland habitat include: big

sagebrush, snowberry, green rabbitbrush, fringed sage, bluebunch wheatgrass, Idaho fescue, smooth brome, Kentucky bluegrass, bitterroot, arrowleaf balsamroot, pussy-toes, vetch spp., prairie smoke, sticky geranium, aster spp., and potentilla spp.

2. Cumulative Impacts and Harvest History

Historic mining activity was likely responsible for much of the old logging that occurred in this area (Losensky 1997). Evidence of past harvesting activities within State ownership is only evident in Unit 1. Old stumps indicate that a low impact selective harvest took place approximately 50-60 years ago on an estimated 10 acres. State files show no records of this harvest activity. Harvest activities on the adjoining USFS, BLM and private ownerships is evident. Much of this activity took place between 1985 and 1997.

Past and ongoing management activities in the Moore Creek drainage include mining, timber harvest, grazing, fire suppression and road construction. Timber harvest activities have been minimal over the past 15 years, constituting approximately 325 acres. Grazing activities have been extensive, with the bulk of the activities concentrating in the riparian areas.

3. Fire History / Ecology

Stands within the project area fall into fire groups 5 and 6 (Fischer and Clayton 1983), which have mean fire intervals of about 40 years. Some of the project area also likely falls within fire group 4, which had mean fire intervals that ranged from 5-20 years. Fuel loadings can vary dramatically within these fire groups (~2-26 tons per acre, Fischer and Clayton 1983), which likely resulted in historic fire intensities that ranged from low intensity ground fires to intense, lethal events (Losensky 1997). Forest conditions within the project area tend to be cool and dry, typically resulting in lower fuel loadings (ie., <20 tons/acre). The presence of old, open-grown stands of Douglas-fir on lower slopes were likely the result of frequent fires burning at lower intensities on gentle slopes (Losensky 1997). The low abundance of old trees with fire scars presently found within the project area indicate that much of the project area was likely influenced by relatively intense fire events, or frequent, low intensity events that prevented the establishment of larger Douglas-fir and lodgepole stands. Thus, the presence

and absence of forest and grassland patches would have been dynamic, shifting substantially through time. Periodically, sites where conifers presently occur would have appeared more as grassland than forest. Surviving individual trees and clumps of trees in moist areas and gentle ridge tops served as seed sources that would have promoted the periodic regeneration of young-aged stands, that may or may not have survived subsequent fire events.

4. Insect and Disease

Currently the forested acres on the State of Montana ownership do not display any serious insect or disease problems. Spruce budworm activity at this time is slight. However, high stand densities, multi-stored stand structure, and climax host species are present and elevate the risk of a spruce budworm outbreak.

5. Successional Stages

Within climatic sections of Montana, Losensky (1997) estimated the age structure of each forest cover type that may have existed in 1900 by backdating inventory data. The Moore Creek area falls under Losensky's (1997) climatic section 13 (Section M332E), which encompasses the southwest corner of Montana and the upper Salmon and Lemhi drainages in Idaho, and includes Beaverhead and Madison Counties, as well as parts of Silverbow, Deerlodge and Jefferson Counties.

In this climatic section, forested cover types were historically found on about 39% of the area, with the remainder being grassland and shrubland. At the turn of the century, 10% of the timber in the climatic section and 19% of the Beaverhead and Madison County timber was old forest >150 years old.

Current forest inventory data on State lands in the Beaverhead and Madison Counties can be used to compare the current age structure of each forest cover type to Losensky's evaluation of conditions that existed in 1900. We do not have a complete stand level inventory of all the forested State lands in Beaverhead or Madison County. An estimate of age structure is available on approximately 67% of the forested State lands. However, the data available is on the majority of lands that have potential for timber harvest activity and therefore would tend to represent stands that

have had human disturbance during the last century and consequently younger age classes are likely represented. Table III -1 displays Losensky's estimate and the current inventory estimate of age structure on the forested State land in the Beaverhead and Madison Counties. Comparison of the date in this table indicates the current age structure of the forested State lands is substantially older than would be expected from Losensky's data. Currently approximately 59% of the forested stands on State lands are greater than 100 years of age. Also, there is currently a greater than expected percentage (39%) of old growth on State land when compared to the historic estimate of 19% on all lands in 1900. High representation of old stands is consistent with the belief that modern fire suppression policies have limited the natural disturbance role played by fire in this region and that human caused disturbances has not approached historic levels of disturbance.

TABLE III – 1: Percentage of area by cover type and age class for Beaverhead and Madison Counties. Historic figures are from Losensky (1997) and represent an estimate of conditions that existed in the year 1900 in Beaverhead and Madison Counties. Current figures are extrapolated from the DNRC inventory, which consists of stand data collected from 67% of the estimated forest area on state land in Beaverhead and Madison Counties.

COVER TYPE (STAND AGE IN YEARS)		NON-STOCKED & SEEDLING/ SAPLING (0-40)	POLE (41-100)	MATURE (101-OG)	OLD GROWTH (OG)[1]
DOUGLAS-FIR	HISTORIC	33%	28%	13%	26%
	CURRENT	6%	28%	21%	47%
SPRUCE-FIR	HISTORIC	4%	41%	22%	33%
	CURRENT	2%	38%	23%	37%
LODGEPOLE	HISTORIC	50%	41%	8%	1%
	CURRENT	22%	39%	16%	23%
AVERAGE OF FOREST	HISTORIC	35%	34%	13%	19%
	CURRENT	10%	31%	20%	39%

1 – Old Growth (OG) is defined as stands 150 years and older (140 for lodgepole pine) that exhibit a range of structural attributes associated with old age and contain a minimum of 4Mbf net per acre.

6. Old Growth

The SFLMP states that DNRC would seek to maintain or restore old growth forest in amounts of at least half the average proportions that would be expected to occur with natural processes on similar sites. In the SFLMP, DNRC conceptually defines old growth as: forest areas that are in the later stages of stand development. Old-growth forests are generally dominated by relatively large old trees, contain wide variation in tree sizes, exhibit some degree of multi-storied structure, have signs of decadence such as rot and spike-topped trees, and contain standing snags and large down logs.

DNRC has adopted a working definition of old growth to assure that the SFLMP commitments are being met. DNRC current defines old growth as stands that are older than 150 years of age (140 years for lodgepole pine), exhibit a range of structural attributes associated with old age and contain a minimum of 4 MBF per acre, net.

Old growth stands >5 acres do not occur within the project area. Occasional old relics and clumps of old Douglas-fir do, however, occur within the project area. These trees typically occur on ridge tops or other protected areas where intense fires were uncommon. Fire frequencies and intensities on forested sites within the project area apparently did not allow the development of extensive old growth development during the last two centuries. Areas where stumps indicate past logging activity took place were also <5 acres and trees that were harvested were typically <20" dbh

In the SFLMP, Resource Management Standard #7 states, "*Biological Diversity Strategies for Forest Type Groups* (Remington's Study) or other current references would be used as guidance for landscape-level biodiversity evaluations, old-growth protection and design of timber harvests to promote biodiversity. The Biological Diversity Strategies would be updated periodically, with professional review, as new information and concepts are developed.

In May, 1998, Remington's Biodiversity Strategies was superseded by the Biodiversity Guidance as allowed for and encouraged under Biodiversity RMS 6 and...The Biodiversity Guidance was sent out for internal and external professional review in the summer and fall of 1997. Remington's Biodiversity Strategies is cited in the

Biodiversity Guidance as being a tool to help suggest appropriate cover types for various habitat types (BIO-9); however, Remington's study is not to be used where it is inconsistent with the Biodiversity RMS or Biodiversity Guidance.

In particular, the Landscape planning and Old Growth Protection portions of Remington's Study are not applicable to current management strategies since they are inconsistent with direction in Biodiversity RMS 1,3 and 6. The adoption of Biodiversity Guidance in May 1998 cleared up these inconsistencies and should be viewed as the current procedure for managing for biodiversity and old growth on State Lands.

The vegetation analysis (including old growth and biodiversity) documented in this environmental analysis is in compliance with the direction specified in the Biodiversity Guidance.

7. Noxious Weeds

Currently there has been no noxious weed infestations detected on the State of Montana parcel.

8. Transportation/Roads

The Tobacco Root Mountains have a rich history of mining, which has left a network of old roads (4x4 jeep trails and two track roads) across the landscape. Most of these roads located within the jurisdiction of the USFS have been closed or have seasonal restriction placed on them per the Forests Travel Guide. Roads on the private ownerships are not maintained for public use, and in some cases are closed to travel by locked gates. The old roads on the State ownership are not open to the public.

Maintained system roads which are open to the public are under the jurisdiction of the USFS. These roads would be identified as the Granite and the South Meadow Creek roads. No system roads exist on the state ownership.

Based on an Analysis Area of 25,280 acres and a Watershed Analysis Area of 19,930 acres the estimated current road density is 1.84 and 1.79 miles per square mile, respectively.

9. Recreation

Persons holding a valid State Recreational Use License may hunt and conduct other non-motorized recreational activities on the State tract. Public access is provided either by crossing the adjoining USFS or BLM ownership. Access to the State of Montana parcel through the adjoining private ownerships is by permission only.

10. Grazing

Historically the State tract has been leased for grazing. The entire 640 acres is currently leased for 207 Animal Unit Months (AUM's). Lease is due for renewal in February 2009. Current annual income from the grazing license is $856.98.

11. Mining

Mining activities have been very limited within the State of Montana ownership. Two permits to provide for exploration of uranium were issued in 1947 and 1957. No other mining activities have taken place.

12. Cultural Resources

During July 12-13, 1999 Patrick J. Rennie, DNRC Archaeologist, conducted an inventory of cultural resources to the proposed Moore Gulch Timber Sale project area. The inventory included proposed sale area and all associated disturbances expected to be contained within portions of Sections 8, 9, 16 and 17, T5S-R2W. In total, a maximum of approximately 124 acres may be impacted with this proposed timber sale, and all areas of potential disturbance were intensively inventoried. Despite the detailed inspection of the project area, no cultural resource sites were identified. No additional archaeological investigative work was recommended in order for the proposed project to proceed.

13. Aesthetics

The proposed project area is located in a remote area and is not in view of any city, town or local resident.

14. Economics

Revenue producing activities associated with this section are grazing and the non-motorized recreational licenses

Currently this section is not licensed for outfitting. Currently the annual gross revenue from the grazing the 207 AUM's on this section is $856.98.

State lands are available for non-motorized recreational use to anyone purchasing a Recreational Use License for State Lands. Licenses are not site specific and allow use of all legally accessible state lands. Therefore, it is very difficult to determine the amount of recreational use and income resulting from license sales for a specific area. Statewide, from March 1, 1998 through February 28, 1999 (the recreational use licensing year), 34,035 General Recreational use Licenses were sold, producing $268,015 in Trust revenue. There is approximately 5,157,380 acres of School Trust land statewide (Annual Report for FY 1998). Therefore an average of one General Recreational Use License was purchased for every 151 acres of state land (5,157,380/34,035) producing an average gross revenue of approximately $.052/acre ($268,015/5,157,380) in 1998. Applying the statewide average revenue/acre to state land in the project area produces an estimated revenue of $33.28 (.052 X 640 acres) per year from General Recreational Use Licenses.

Annually the DNRC analyzes the total costs, including general administration, of the timber sale program by land office and statewide. The following table displays the revenue-to-cost ratios for the state and Central Land Office. The revenue-to-cost ratios are a measure of economic efficiency. A ratio value less than 1.0 means that the costs are higher than revenues (losing money). A ratio greater than 1.0 means revenues are higher than costs (making money). A ratio equaling 1.0 means that cost equal revenues.

TABLE III – 2: Revenue-to-Cost Ratios State-wide and for the Central Land Office.

	FY95	FY96	FY97	FY98	FY99
CLO	1.44	1.45	3.56	2.20	2.15
State	2.07	1.68	1.89	1.72	1.36

15. Landscape Analysis Areas

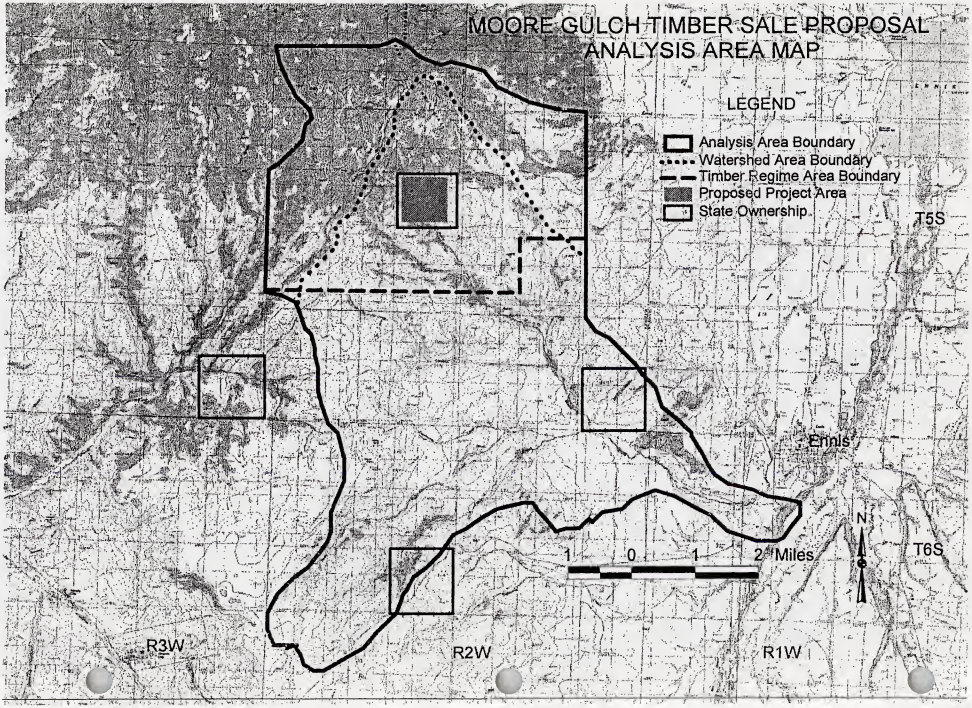
Four analysis areas were developed to assist in the process of evaluating the different resources and features in the vicinity of the proposed project area (see FIGURE III - 4). The Wildlife Analysis Area consists of 25,280 acres. A Watershed Analysis Area consisting of 19,930 acres was delineated for the analysis of potential watershed impacts. The Timber Regime Analysis Area consists of 10,420 acres, and displays the forest cover within an average two mile radius of the proposed project area. The fourth area is the State section where the project is proposed. The following data summary tables shows the overall statistics associated with each analysis area.

TABLE III – 3: Analysis Area By Ownership.

	Acres	% of Ownership
Private	15,830	62%
BLM	5,060	20%
USFS	2,950	12%
State of Montana	1,440	5.7%

TABLE III – 4: Analysis Area Summary.

	Total Area (Acres)	Non-forested Area	Pre-harvest Forested Area	Area Harvested '85-'98	Existing Forested Area
Analysis Area	25,280	19,440 (77%)	5,840 (23%)	1,423 (5.6%)	4,417 (17%)
Watershed Area	19,930	17,100 (86%)	2,830 (14%)	325 (1.6%)	2,505 (13%)
Timber Regime Area	10,420	5,496 (53%)	4,925 (47%)	1,423 (14%)	3,502 (34%)
Project Area – S 16	640	430 (67%)	210 (33%)	NONE	210 (33%)


MOORE GULCH TIMBER SALE PROPOSAL
ANALYSIS AREA MAP
LEGEND
Analysis Area Boundary
Watershed Area Boundary
Timber Regime Area Boundary
Proposed Project Area
State Ownership
T5S
Ennis
N
1 0 1 2 Miles
T6S
R3W
R2W
R1W

C. Water Quality, Water Yield, and Soils

1. Watersheds:

The proposed sale area lies within one state section surrounded by USFS, BLM and private land. Precipitation ranges from 20-30 inches annually. The proposed sale area is drained by Moore Creek, a 19,930 acre fourth order watershed. It is a Class I perennial stream under the Montana Streamside Management Zone (SMZ) Law and Rules.

A DNRC Hydrologist evaluated all stream channels and ephemeral draw bottoms draining the proposed sale area. The watershed analysis area has been further divided into 6 unnamed tributaries of Moore Creek to facilitate hydrologic analysis and cumulative watershed effects assessment (see map III-5). Each unnamed tributary contributing surface flow to the mainstem of Moore Creek is numerically categorized and described below.

Tributary # 1: This is a Class I stream. It contains perennial flow beginning approximately 150 feet above its confluence with tributary number two. The remaining upper reaches of this drainage feature contain ephemeral flow.

Tributary # 2: Contrary to the USGS quadrangle map, this stream channel is ephemeral for the majority of it's upper reaches. The lower reaches are spring fed and contain both perennial and intermittent flow. Surface flow near the confluence of Moore Creek disperses through a broad adjacent wet area.

Tributary # 3: This is a perennial Class 1 stream. It is the main source of perennial flow to Moore Creek. This stream is ephemeral near the west third of proposed unit 3. There is no surface flow at the proposed road crossing. Below the crossing, there are two springs with large headcuts. Near the confluence of these two springs, the channel flows through a spruce bog until it reaches Moore Creek.

Tributary # 4: This is a Class I stream. This tributary is very similar to tributary # 5 and the mainstem above tributary # 3. Stream discharge along these reaches is lower than that of tributary # 6.

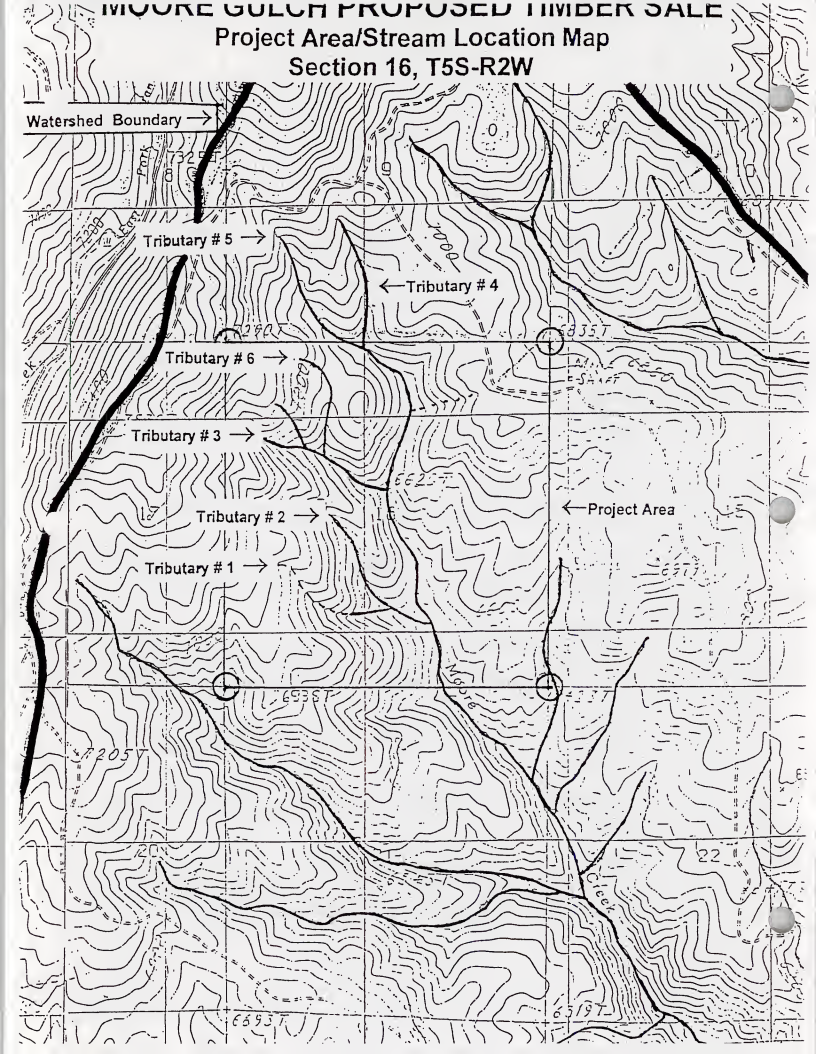
Tributary # 5: This is a Class I stream. This tributary is very similar to that of the rest of the mainstem. Analogous to tributary # 4, stream discharge is also lower along these reaches.

Tributary # 6: This is a Class I stream. It is actually the headwaters to Moore Creek. This stream has the highest discharge at this elevation. It is a tributary to tributary # 3. There is a large spring from the NW that contributes surface flow to this stream. The spring surfaces just below the proposed road location near proposed unit 4.

MOORE GULCH PROPOSED TIMBER SALE

Project Area/Stream Location Map

Section 16, T5S-R2W



2. Regulatory Framework:

This portion of the Missouri River basin, including the Moore Creek drainage, is classified B-1 in the Montana Water Quality Standards. Waters classified B-1 are suitable for drinking, culinary and food processing purposes after conventional treatment; bathing, swimming and recreation; growth and propagation of salmonoid fishes and associated aquatic wildlife, waterfowl and furbearers; and agricultural and industrial water supply. State water quality regulations prohibit any increase in sediment above naturally occurring concentrations in waters classified B-1 (ARM 16.20.618 2(f)).

Naturally occurring means conditions or materials present from runoff or percolation over which man has no control or from developed land where all reasonable land, soil and water conservation practices have been applied. Reasonable land, soil and water conservation practices include methods, measures or practices that protect present and reasonably anticipated beneficial uses. The state of Montana has adopted Forestry Best Management Practices (BMPs) through its Non-point Source Management Plan as the principal means of meeting Water Quality Standards.

Existing beneficial uses in the immediate vicinity of the proposed sale area include water rights for groundwater sources to include: stock, wildlife and domestic uses. Surface water sources include: stock, irrigation, power generator and mining uses. There are no sensitive beneficial uses in the sale area, however; downstream sensitive beneficial uses within the analysis area include aquatic life support and cold water fisheries.

Moore Creek (MT41F004-13) is listed as a water quality limited water body (as per Section 303(d) of the Clean Water Act) in the 305(b) report. Probable cause of impairment are arsenic and pathogens with probable sources being agriculture, grazing and acid mine drainage. The 303(d) list is compiled by the Montana Department of Environmental Quality (DEQ) as required by Section 303(d) of the Federal Clean Water Act and the Environmental Protection Agency (EPA) Water Quality Planning and Management Regulations (40 CFR, Part 130). Under these laws, DEQ is required to identify water bodies that do not fully meet water quality standards, or where beneficial uses are threatened or impaired. These water bodies are then characterized as "water quality limited" and thus targeted for Total Maximum Daily Load (TMDL) development. The TMDL process is used to determine the total allowable amount of pollutants in a water body or watershed. Each contributing source is allocated a portion

of the allowable limit. These allocations are designed to achieve water quality standards.

The Montana Water Quality Act (MCA 75-5-701-705) also directs the DEQ to assess the quality of state waters, insure that sufficient and credible data exists to support a 303(d) listing and to develop TMDLs for those waters identified as threatened or impaired. Under the Montana TMDL Law, new or expanded nonpoint source activities affecting a listed water body may commence and continue provided they are conducted in accordance with all reasonable land, soil and water conservation practices. Total Maximum Daily Loads have not been completed for the Moore Creek drainage. DNRC will comply with the Law and interim guidance developed by DEQ through implementation of all reasonable soil and water conservation practices, including Best Management Practices and Resource Management Standards as directed under the State Forest Land Management Plan.

The causes of impairment in Moore Creek are arsenic and pathogens with the probable sources being agriculture, grazing-related sources, acid mine drainage, abandoned mines, natural sources and pasture land. According to this report, 15.2 miles of Moore Creek's drinking water supply and recreation use is not supporting. The aquatic life support and cold water fishery beneficial uses have not yet been fully assessed. Moore Creek's priority for TMDL development is listed as unknown at this time.

The Montana Streamside Management Zone Law (MCA 77-5-301) and Rules regulate timber harvest activities that occur adjacent to streams, lakes and other bodies of water. This law prohibits or restricts timber harvest and associated activities within a predetermined (SMZ) buffer on either side of the stream. The width of this buffer varies from 50-100 feet, depending on the steepness of the slope and the class of the stream.

The Montana Stream Protection Act (MCA 87-5-501) regulates activities conducted by government agencies that may affect the bed or banks of any stream in Montana. This law provides a mechanism to require implementation of BMPs in association with stream bank and channel modifications carried out by governmental entities. Agencies are required to notify the Montana Department of Fish, Wildlife and Parks (MDFWP) of any construction projects that may modify the natural existing conditions of any stream.

3. Water Quality:

Moore Creek has been impacted by accelerated rates of sedimentation. Both the existing road systems, and past and current grazing

management strategies have contributed to these impacts. Approximately 10.1 miles of county and US Forest Service cost-share road provide access to the sale area. These road systems meet current BMP standards. An additional combined ~ 1.6 miles of USFS, BLM, private and DNRC secondary roads also provide access to the sale area. These road systems all lack surface drainage and do not currently meet BMP standards. The existing roads will continue to be a potential source of impacts to downstream water quality and beneficial uses unless remedial action and mitigation measures are undertaken.

4. Cumulative Watershed Effects:

Past and ongoing management activities in the Moore Creek drainage include mining, timber harvest, grazing, fire suppression and road construction. Timber harvest activities have been minimal over the past 15 years, constituting approximately 325 acres. Grazing activities have been extensive, with the bulk of the activities concentrating in the riparian areas.

A cumulative watershed effects (CWE) analysis for the proposed sale area was completed by DNRC to determine the existing conditions of the affected watershed and the potential for cumulative effects due to increased water and sediment yields. The Moore Creek watershed was chosen as the analysis boundary. This analysis area was selected because it was determined to be the most appropriate scale to detect potential effects. A summary of recent research suggests detection of hydrologic cumulative effects should focus on third-to fourth-order basins (NCASI, 1999).

The CWE analysis was completed using a Level II coarse filter screening (outlined in SFLMP Watershed RMS # 7). The coarse filter approach consisted of on-site evaluation, mapping the percent forested of the watershed and documenting history of past timber management activities through the use of maps, aerial photographs and harvest records. Field reconnaissance and assessments were used to collect additional data and to verify information obtained through aerial photo and map interpretation.

Existing cumulative watershed effects due to increases in water yield are very unlikely in the Moore Creek watershed due to the following reasons:

- Only a minor amount of the watershed area has been harvested in the past 15 years.
- The existing partially forested natural condition of the watershed. Open, range-like watersheds evolved under conditions with less forest

crown and thus less evapotranspiration.
- Presently, there is likely more total forest cover and leaf area in the watershed following forest encroachment on rangeland and fire suppression.
- Field evaluations found no evidence of channel instability or alterations resulting from increases in peak flows.

A detailed water yield analysis was not completed for the Moore Creek watershed due to the low potential for and lack of evidence of increased water yield due to timber harvest activities.

Existing harvest levels are well below those normally associated with detrimental water yield increases. It is generally excepted that up to 20-30% of the watershed area can be harvested before detectable increases in peak flows occur (USFS, 1974). Table III - 5 summarizes the existing conditions of the Moore Creek watershed.

TABLE III – 5: Watershed Existing Condition Analysis.

MOORE GULCH PROPOSED TIMBER SALE Watershed Existing Conditions Analysis					
Watershed	**Drainage Pattern**	**Total Acres**	**Existing Road Miles**	**Percent Forested**	**Percent Harvested**
Moore Creek	Perennial	19,930	56*	14%	1.6%

* NOTE: Due to the size of the watershed and a complicated road network consisting of jeep trails and old mining roads with no road prism, this number represents only primary and secondary road systems that could be interpreted off of maps and aerial photographs.

A DNRC Hydrologist evaluated all primary and secondary roads within the proposed sale area. Field evaluation indicates that past timber harvest activities within the proposed sale watershed analysis area have resulted in impacts to water quality. These impacts are limited to sediment delivery and surface erosion and are restricted to stream crossings and isolated segments of existing road.

5. Cold Water Fisheries:

Fisheries surveys completed by the Montana Department of Fish Wildlife and Parks (MDFWP) for Moore Creek found rainbow trout, brown trout and arctic grayling (Vincent, 1980). Personal communication with Pat Byorth, MDFWP confirmed "observation" of arctic grayling in several reaches within two miles of Ennis Lake in 1980. Personal communication with Ken McDonald, FWP revealed that the Moore Creek grayling population is considered an adfluvial sport fish and therefore not a

sensitive species of concern. No cutthroat trout were found in any of the reaches surveyed.

6. Geology and Terrain:

The sale area is located on gentle and some moderate slopes with shallow to deep soils weathering from metamorphic gneiss bedrock, which are erosive, but generally more stable than granitics. There are no especially unusual or unique geologic features in the proposed harvest area. There are several small faults and bedrock mineralization zones where the rock is altered. Slopes are generally stable due to the extensive area of shallow bedrock and only small, localized sites of marginal slope - stability were observed within the project area, outside of areas considered for harvest or road construction activities. Bedrock exposed on ridges is generally rippable and material quality is good for road construction.

7. Soils:

Soil map units were taken from the Madison County Soil Survey and modified based on field review. The sale area is located on moderate to steep slopes with high rock fragment residual soils on the mountain ridges. Moderate to deep, stony and flaggy (flagstone) sandy loams soils weathering from metamorphic gneiss bedrock occur on the mountain sideslopes. Cold climate and dry summers limit moisture and affect tree growth.

Primary soils on forested sites within the proposed harvest area are Shadow complex soils with a described slope range of 35-70% for the soil map units, but site review verified slopes as generally 25-50% on site. Shadow very channery sandy loams on forested sites typically have an inch of duff over very channery sandy loam topsoil with coarse textured subsoils of extremely channery and stony loams of shallow to moderate depth. Moisture holding capacity and nutrient retention are fairly low and mainly concentrated in the soil surface. Rock outcrops occur on ridges and convex slopes and can limit equipment operations. Slopes up to 40%, are well suited to conventional ground based harvest methods. These soils are droughty and subject to erosion where disturbed. Erosion can be controlled by installing adequate drainage and grass seeding of trails where needed. Leaving slash can provide shade to enhance survival of seedlings. Grass competition is a concern, but regeneration of trees is fair.

Steeper, south slopes have high ratings for potential erosion and displacement. These risks can be mitigated by use of cable harvest. These

soils have a long season of use and material quality is good for road construction.

Soils dry out rapidly after snowmelt in most proposed harvest units and allow adequate season of use from about July through fall. Harvest operations and road use will be limited to dry, frozen or snow covered conditions. Erosion can be controlled with standard drainage in skid trails where needed.

There are a few 4 wheel drive roads currently used for range management in the section. Some segments of road are on suitable grades and can be reconstructed, but most of old 4 wheel drive roads are narrow, too steep, and eroding.

D. Big Game Winter Range, Elk Security and Vulnerability

1. Big Game Winter Range:

This State of Montana section maintains cover usable by elk and mule deer in winter. Densely stocked thickets of conifer regeneration and overstocked mature stands provide good thermal protection for elk and deer, which can reduce energy expenditures and stress associated with cold temperatures. Areas in the section with densely stocked mature trees are also important for snow interception, which makes travel and foraging less stressful for elk and deer during periods when snow is deep. Dense stands are currently somewhat connected and provide for animal movements throughout the section during adverse weather conditions. Snow depths in the vicinity of the project area frequently range from about 2 feet in the lower foothills and grasslands to ~4 feet in forest types at mid elevations (B. Brannon DFWP, pers. comm. July 1999). The project area likely receives winter use by elk. The actual extent of winter use is not known, but based on observations of light use on desirable forage species, it is suspected that the parcel does not normally receive use by large numbers of elk and deer for extended periods.

A GIS winter range map (1996 DFWP data) was requested for the southern portion of the Tobacco Root Mountains. This map depicts the nearest identified winter range as occurring >2 miles from section 16. Section 16 is considered usable as winter range for elk and mule deer, especially during mild winters, but not necessarily "key" winter range (ie., wintering areas that provide for relatively large groups of animals year after year, or are believed to provide critical cover during extreme weather events). DNRC is not aware of any winter range that would be considered "key" that lies adjacent or within 2 miles of the project area.

2. Elk Security and Vulnerability in the Tobacco Roots:

The Tobacco Root Mountains are an isolated range that occurs in southwest Montana. The northern-most point of the Tobacco Root Mountain Range lies about 8 miles south of Whitehall, Montana and the range occupies a land area of about 330 square miles. The Tobacco Root Elk Management Unit (EMU) (includes DFWP Hunting Districts 320 and 333) encompasses the Tobacco Root Mountains and additional surrounding lands, and it covers about 626 square miles (DFWP 1992). In the Tobacco Root Mountains, habitats range from grassland-sagebrush along foothills at lower elevations (~6,000 feet) to those at the highest elevations (up to ~10,500 feet) characterized by rocks, scree, whitebark pine, subalpine fir and alpine grasslands (USFS 1999). Mature Douglas-fir and lodgepole pine forests dominate vegetation communities found at mid-elevations. An analysis area was delineated for the Tobacco Root Vegetation Management Plan by Madison Ranger District personnel (USFS 1999) that roughly encompassed the southern half to the Tobacco Root Mountain Range. This analysis area consisted of about 114,000 acres, of which 37,473 acres (~33%) were considered to provide security cover. Security cover in the Tobacco Root Plan was considered patches of mature timber $\geq$200 acres and $\geq$1/4 mile from a road or motorized trail during hunting season (USFS 1999). In the Tobacco Roots Plan (USFS 1999:17) >75% of section 9 (lower right corner) is indicated as a "wildlife security block." Based on the level of existing cover in that section, distance from other cover patches and existing access, this may be a mapped over-representation of security in the context of elk. The criteria for security used in the Tobacco Roots Plan are also slightly less constraining than the Hillis et al. (1991) definition developed for forests in western Montana, which essentially requires a minimum of 250 acres of mature timber (contiguous and non-linear) that is $\geq$ 1/2 mile from an open road during hunting season. It is probably safe to assume security cover in the Tobacco Roots using either of these definitions is likely to be about 30%, which is the minimum level of retention suggested by Hillis et. al. (1991). As described in the Tobacco Root Vegetation analysis (USFS 1999:47), 57% of the security cover occurs at elevations >8,100 feet. Thus, cover at high elevations would be unavailable for elk during periods when snow conditions are deep. However, security cover at higher elevations would likely be available for use by bulls during the first week of the general big game season during most years. Security cover at lower elevations is likely very important for minimizing bull elk vulnerability under the broad range of weather conditions that can occur in the Tobacco Roots during the fall.

Most of the elk winter range in the Tobacco Roots occurs on private lands managed for livestock and hay production (DFWP 1992). Thus, reduced security and displacement of elk off public lands can indirectly contribute to increases in game damage on nearby private lands.

Elk counts in the Tobacco Roots have ranged from 756 to 1119 during the 10 year period from 1990 to 1999 (USFS 1999). The percentage of bulls within the herd has ranged from 7.5% in 1991 to 11.7% in 1998 with an average of about 9% (USFS 1999). The majority of bulls counted typically fall in the 1.5 to 2.5-year age classes. The three-year average for percent bull harvest during the first week of the general rifle season for DFWP Tobacco Root EMU exceeded 40% for 1993, 1994 and 1995 (DFWP unpubl data). Thus, DFWP did not meet the Habitat Objective that ..."no more than 35-40% of the bull harvest [should be] taken during the first week of the general season" (DFWP 1992) during that time period. Data are presently unavailable for 1996-1999.

A 25,280-acre Landscape Analysis Area surrounding the project area was subjectively delineated based on vegetative, topographic and watershed considerations (see Analysis Area Map under Chapter III – B, Item 16). Within the Analysis Area road density is presently about 1.8 miles per square mile (simple calculation). Existing forested acres within this analysis area were estimated at ~4,417. About 1,423 acres of additional forest were harvested between 1984 and 1998. These 1,423 acres are presently non-forested, sparsely forested or young conifer regeneration. None of the acres harvested between 1984 and 1998 are considered to provide secure elk cover at present.

Existing Condition and Value of the Project Area for Elk Security:

About 210 acres of the 640-acre project area are forested. The forested habitat found in the section is comprised of small fragmented patches, the largest of which is ~50 acres. Most of the patches are between 10 and 30 acres. The remaining ~430 acres within the section consist of grasslands. The following terminology is used to describe elk habitat values in the context of the project area and is consistent with Lyon and Christensen (1992).

Security - The protection inherent in any situation that allows elk to remain in a defined area despite an increase in stress or disturbance associated with the hunting season or other human activities.

Hiding Cover (functional def.) – Hiding cover allows elk to use areas for bedding, foraging, thermal relief, wallowing, and other functions

year-round. Hiding cover may *contribute* to security at any time, but it does not necessarily *provide* security during the hunting season (italics added).

Elk Vulnerability – A measure of elk susceptibility to being killed during the hunting season.

None of the existing forested patches nor the amalgamation of patches found on the project area (including existing forest patches on neighboring ownerships) presently meet the above definition of security for elk or the Hillis et al. (1991) definition. The stands in the project area and on adjacent ownerships are too open, patchy and isolated from other larger blocks (>250 acres) of dense, mature forest cover and thus, have low probability of holding elk for any appreciable period of time during the hunting season. All of the forested patches in the project area are <1/2 mile from open roads or jeep trails, which further hinders their ability to provide security. However, the forested patches in the project area have value for *hiding cover*, which can serve to lower bull elk vulnerability. Retaining the greatest amounts of dense forest cover possible would pose the least risk of increasing elk vulnerability from present levels. The greater numbers of elk that use a particular area, the more important cover patches are as they serve to reduce vulnerability of a greater portion of animals.

It is unknown how much the project area is used by elk during all seasons. During the July 14, 1999 field tour, the DNRC biologist counted elk fecal pellet groups while walking through each of the proposed harvest units. The total count was eight pellet groups along an estimated route length of 1.5-2 miles, suggesting that elk had used the area. However, considering the low observed elk use of vegetation (eg. aspen etc.) and the relatively low abundance of pellet groups in the area, it does not appear that section 16 currently receives substantial levels of use by elk for extended periods of time. Bob Brannon (DFWP, Biologist, R-3) indicated during the tour that ~200 head made use of the southeast portion of the Tobacco Roots, and that counts are consistently about 500 for HD 320. The specific annual home range for these elk, and the seasons and amount of time elk typically use the project area are not known.

E. *Threatened, Endangered, and Sensitive Species*

1. Fine Filter Wildlife Issues

A fine filter analysis was conducted on the project proposal area for the following species

Threatened and Endangered Species: bald eagle, gray wolf, Canada lynx and grizzly gear.

DNRC Sensitive Species: flammulated owl, boreal owl, black-backed woodpecker, pileated woodpecker, northern bog lemming, harlequin duck, ferruginous hawk, mountain plover, peregrine falcon and Townsend's big-eared bat.

There is no documented use, nor is there appropriate habitat within the proposed project area for any of these species. However there is potential for future, occasional, or incidental use by gray wolf, ferruginous hawk, flammulated owl and lynx. A summary of the analysis can be found in Chapter IV.

2. Plant Species of Special Concern:

Pink Agoseris (Agoseris lackschewitzii)

Known populations of this species are found in mid-montane to subalpine meadows where soil is generally saturated throughout the growing season.

This species is known to occur on the southern half of the Beaverhead Deerlodge National Forest. According to the USFS Tobacco Root EA Biological Evaluation there are fourteen known populations in the Tobacco Root Range. The MNHP's input confirms this with six reports. All reports show this species being located above 6,650 feet which which would be the upper most limit of the proposed project area.

Since no disturbance of wetlands is proposed by any of the action alternatives this species will not receive further consideration in this assessment.

CHAPTER IV – ENVIRONMENTAL EFFECTS

A. INTRODUCTION

This chapter will describe the probable effects of the various aspects of the affected environment as presented in Chapter III.

B. BACKGROUND

1. Forest Vegetation

The no action alternative would leave all vegetation undisturbed. The action alternatives of harvesting 75 or 45 acres would alter 36% or 21% of the forested acres, respectively. The new road construction associated with the action alternatives would adjust these figures to 37% and 22%, respectively. Based on the total area of the section the proposed set of alternatives would alter the vegetation on an estimated 12% and 7% of the area, respectively. The few old scattered trees and clumps along the ridge tops would be retained. The areas affected would be harvested in a manner to regenerate a younger, healthy stand within 10-15 years.

2. Cumulative Impacts

There has not been any harvest activities within the State of Montana ownership that would change or convert cover types to another classification.

To evaluate the cumulative impact of the proposed timber harvests on the State of Montana ownership, Losensky's data summaries for the Beaverhead and Madison Counties was compared with the inventory of state forested lands and anticipated changes under each of the alternatives. The 75 acre and 45 acre action alternatives would move approximately 1% of the 101-150 age class Douglas-fir cover type to the non-stocked\seedling age class. The data comparison also indicates that under all alternatives, the forested stands for all cover types on the state land post-harvest would remain older than anticipated.

3. Fire History / Ecology

No Action Alternative

The No Action alternative would result in no appreciable change in the forest cover types or stand structures in the near term. Current successional patterns would continue. The Douglas-fir stands would continue to be dominated by Douglas-fir, with a very gradual trend to increase the number of more shade tolerant species in its understory. Tree mortality from potential insect infestations (ie. Western Spruce budworm or Douglas-fir beetle) would contribute to site factors that would be conducive to stand replacement fires. Such an event would likely revert the forest stands back to a grassland-sage cover type with a few scattered old remnant trees that would have survived due to micro-site conditions or location.

Action Alternatives

None of the action alternatives would change the classification of forest types within the State of Montana section. All the proposed harvest treatments, except in unit 2, would be selection harvests focusing on leaving approximately 25 to 30% of the stand as individual seed trees or small clumps of trees. Unit 2 would be a small three-acre clearcut harvest. These treatments scattered across a landscape would emulate natural small-scale disturbance events. Harvest treatments would reduce the likelihood of stand replacement events from occurring by reducing the stands' susceptibility to insect and disease infestations and the subsequent fuel build-up, and reducing fuel loads of the treated stands.

4. Insect and Disease

Under the no action alternative all stands would be susceptible to spruce budworm infestations due to overstocked and multi-story conditions. All of the action alternatives would reduce the likelihood of spruce budworm infestation in the harvested units. The post treatment stands would be somewhat less susceptible to the budworm infestations since primarily healthy, open stands would remain. Open stands where tree growth and vigor is encouraged and a mosaic of age classes are developed are more resistant to spruce budworm infestations (Carlson et.al.,1983).

5. Successional Stages

The No Action alternative would result in continued succession toward a climax vegetation condition unless fire or other disturbance intervened to move succession back to the non-stocked and seedling/sapling stage.

Alternatives B or D would essentially convert 75 acres of Douglas-fir distributed over 7 units to a non-stocked/seedling stage.

Proposed treatments under Alternatives C or E would convert 45 acres of Douglas-fir distributed over 4 units to a non-stocked/seedling stage.

6. Old Growth

Since no old growth stands occur within the proposed project area, there would be no effects on old growth. Relics, snags and coarse woody debris, which are important attributes associated with old growth and future development of old growth, would be retained where they don't present safety hazards.

7. Noxious Weeds

Under the no-action alternative, noxious weeds may become established on 4 wheel drive roads and onto dry vegetation sites by vehicle or animal use, depending on the weed control efforts of the grazing lessee.

The action alternatives involve ground-disturbing activities that have the potential to introduce or spread noxious weeds in susceptible habitat types. For the action alternatives, an Integrated Weed Management (IWM) approach, combined with prevention and revegetation, are considered the most effective weed management treatments. To reduce the possible introduction and spread of weeds associated with this project, mitigation measures to address the management of weeds are included in Chapter II – C.1. "Mitigation Measures Common To All Action Alternatives".

8. Transportation/Roads

Under the No action alternative, road densities for the analysis

areas would remain at 1.8 miles per square mile. The implementation of the action alternatives would increase the road density to 1.9 miles per square mile.

9. Recreation

Since non-motorized recreational activities are allowed on the State of Montana tract and public access is provided either by crossing the adjoining USFS, BLM or private (by permission) ownership, the proposed action alternatives would not affect the recreational status of the section.

10. Grazing

The action alternatives would not effect the grazing lease that is currently established on the State of Montana section.

11. Mining

Since there are no mining activities within the State of Montana section there would be no effects from the initiation of the action alternatives.

12. Cultural Resources

Since no cultural resource sites were identified and no additional investigative work is recommended there would be no effects expected from the initiation of the action alternatives as proposed.

13. Aesthetics

Since the proposed project area is located in a remote area with no visual contact with a public road system or city, town or local resident the initiation of the action alternatives would not effect the visual quality of the area.

14. Economics

Economic Assumptions:

a) Costs, revenues, and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return.

b) The estimated stumpage value equals the delivered log prices minus costs and an amount for profit and risk. Costs include logging costs, haul costs, forest improvement (FI) fees, development costs, and other costs (e.g., road maintenance). Profit and risk is the return to timber buyer that accounts for actual time and effort, some profit for entrepreneurial spirit, and something to cover the expected losses on an occasional sale that is not profitable.

TABLE IV – 1: Estimated Stumpage $/MBF by Alternative

	Alt B[1]	Alt C[1]	Alt D	Alt E
Delivered Log Prices	$ 413.00	$ 412.00	$ 413.00	$ 412.00
Logging Cost $/MBF	$ 82.97	$ 82.97	$ 82.97	$ 82.97
Haul Cost $/MBF	$ 69.00	$ 69.00	$ 72.13	$ 72.13
Development Cost $/MBF	$ 49.30	$ 57.48	$ 53.38	$ 62.22
FI Fee $/MBF	$ 13.02	$ 13.02	$ 13.02	$ 13.02
Profit & Risk (5% of Delivered Log Prices)	$ 20.65	$ 20.60	$ 20.65	$ 20.60
Estimated Stumpage $/MBF	$ 178.06	$ 168.93	$ 170.85	$ 161.06

[1] These estimates of stumpage values assume that the new road construction on the USFS ground would be obliterated. If this is not required, the estimated stumpage for alternative B would equal $180.90 $/MBF and for alternative C would equal 173.25 $/MBF.

c) The estimated gross revenue to the trust for an alternative is calculated by multiplying the estimated alternative stumpage price by the estimate alternative volume. The state also collects money for Forest Improvement (FI). The estimated total collected FI equals the FI fee rate multiplied by the estimate alternative volume. The following table displays the estimated revenue to the state by alternative from this proposed sale.

TABLE IV – 2 Estimated Gross Revenue to the Trust and Total Collected Forest Improvement (FI) Fee by Alternative

	Alt B[1]	Alt C[1]	Alt D	Alt E
Est. Total Volume (MBF)	920.8	603.9	920.8	603.9
Est. Gross Revenue to the Trust	$163,958	$ 102,017	$157,319	$ 97,264
Est. Total Collected FI fee	$ 11,989	$ 7,863	$ 11,989	$ 7,863

[1] These estimates of gross revenue to the trust assume that the new road construction on the USFS ground would be obliterated. If this is not required, the gross revenue to the trust for alternative B would equal $166,573 and for alternative C would equal $104,626.

Table IV – 3: Analysis Area Data Summary of Affects

	Total Area (Acres)	Total Forested Area	% of Total Area Affected	
			Alt B & D	Alt C & E
Analysis Area	25,280	4,417	0.3%	0.02%
Watershed Area	19,930	2,505	0.4%	0.2%
Timber Regime Area	10,420	3,502	0.7%	0.4%
Project Area – S 16	640	210	12%	7%

C. *Water Quality, Water Yield and Soils*

1. Effects to Water Quality:

Under the No Action Alternative, existing substandard roads with inadequate surface drainage and buffer zones may continue to impact water quality and downstream beneficial uses unless mitigation and remedial actions are undertaken.

Harvest units can directly impact water quality if not properly located or buffered. The risk of impacts is greatest along streams, wetlands and lakes. The Streamside Management Zone (SMZ) Law regulates forest management activities that occur adjacent to streams, lakes or other bodies of water. The proposed harvest activities are expected to have minimal impacts to the SMZ, provided all requirements of the law are met.

Portions of the sale area are drained by ephemeral draws, swales and wet areas that lack discernable stream channels. Equipment restrictions and designated crossings would minimize impacts and help protect all wet areas and ephemeral draws.

All new roads constructed on federal government ownership would be recontoured and seeded. Extent and timing of this obliteration would be based on the conditions of the access permit. The differences between the proposed new road construction of each action alternative are minimal at this scale and would not likely be detectable from a hydrologic standpoint. Therefore, the maximum proposed mileage was used for the purposes of this analysis. Table IV – 4 summarizes the proposed activities of each action alternative.

TABLE IV – 4

MOORE GULCH PROPOSED TIMBER SALE
Proposed Activities by Alternative
Moore Creek Watershed

Alternative	Proposed Harvest Acres	Total New Road Construction	Temp. Road Construction*
Alt. B	75	2.68	0.87
Alt. C	45	2.04	0.87
Alt. D	75	2.89	0.72
Alt. E	45	2.20	0.72

- All temporary roads will be re-contoured and seeded at the end of the sale.

The proposed new road construction for each action alternative is considered to have minimal risk to water quality and beneficial uses; provided site-specific design and mitigation measures are met. Otherwise, the risk of adverse impacts and inoperable conditions may occur. Proper application of BMPs and site- specific design and mitigation measures would reduce erosion and potential water quality impacts to an acceptable level as defined by the water quality standards. Acceptable levels are defined under the Montana Water Quality Standards as those conditions occurring where all reasonable land, soil and water conservation practices have been applied.

Some short-term impacts to water quality may occur due to sediment induced at stream crossing ephemeral draw bottoms during or shortly after new road construction activities. Risk of impacts occurring during new stream crossing installations would be minimized provided site specific design recommendations from DNRC Hydrologist, Soil Scientist and MDFWP Fisheries Biologist are met. All stream crossing sites are subject to approval from MDFWP through the 124 permitting process required under the Montana Stream Protection Act.

Up to 0.26 miles of existing low standard road on USFS land and 0.16 miles on private land, provide partial access to the proposed project area. Depending on which access route is chosen, the recommended improvements to these road segments from DNRC Hydrologist and Soil Scientist are expected to minimize impacts during the proposed activities as well as reduce long-term sediment erosion and delivery.

2. Cumulative Watershed Effects:

The no-action alternative would not contribute to cumulative watershed effects. Minimal timber management activities in the Moore Creek drainage and the range-like landscape have resulted in undetectable cumulative watershed effects. Cumulative impacts from cattle grazing may continue to occur, provided the current management strategies remain the same.

Results from the cumulative effects analysis show that projected harvest levels are below those levels normally associated with detrimental water yield increases and channel impacts. Proposed harvest for alternatives B & D equates to 0.4% of the watershed area, while alternatives C & E equates to 0.2%, thus increasing the total cumulative harvested area to approximately 2.0% and 1.9%, respectively. It is unlikely that these levels of harvest would contribute to detectable increases in water yield or have any measurable influence on downstream channel conditions (USFS, 1974).

The proposed activities have the potential to increase sediment input into the affected stream channels during the short-term. However, recommended mitigation measures aimed at recontouring and seeding new temporary roads, stabilizing existing roads and implementation of the SMZ Law and Rules would minimize long-term sediment yield impacts. The results of the analysis are summarized below in Table IV – 5.

TABLE IV – 5:

MOORE GULCH PROPOSED TIMBER SALE
Cumulative Effects Analysis
Moore Creek Watershed

Alternative	Cumulative Harvest (acres)	Cumulative Harvest (% Watershed)	Cumulative Road Miles*	Cumulative Road Miles* (Following Recontouring)
Alt. B	400	2.0	58.7	57.8
Alt. C	370	1.9	58.0	57.1
Alt. D	400	2.0	58.9	58.2
Alt. E	370	1.9	58.2	57.5

* Rounded to nearest tenth.

There is little risk of cumulative watershed impacts occurring from this sale proposal due to the following reasons:

- The moderate level of existing harvest activity in the analysis area.
- The majority of existing harvest contains selective or partial crown removal.
- The low level of additional crown removal and potential water yield increase that would be generated by the proposed actions.
- Existing cumulative watershed impacts appear to be limited to sedimentation resulting from poor road location, design and high run-off or flood events and cattle grazing.
- The proposed improvements to the existing road system on state land will benefit long term water quality and watershed conditions.

- The stands prescribed for treatment are overstocked stands due to fire suppression and forest encroachment in rangeland.
- All new road construction would be closed through recontouring and seeding or slashed and seeded, depending on ownership.

3. Effects on Cold Water Fisheries:

The no action alternative would continue to impact cold water fisheries habitat through increased bank instability, erosion and sedimentation due to the current grazing plan and substandard road systems.

The proposed activities have the potential to increase sediment input into the affected stream channels during the short-term. However, recommended mitigation measures aimed at recontouring and seeding new temporary roads, stabilizing existing roads, and riparian tree retention will minimize long-term impacts to water quality and fish habitat.

It is unlikely that the proposed actions will impact shade, temperature or large woody debris recruitment of fisheries streams. This is due to the fact that the unit boundaries, by design, fall on the SMZ boundaries. No harvest activities are proposed adjacent to any known fish bearing streams. No SMZ harvest is proposed for this sale.

Best management practices, Fisheries and Watershed Resource Management Standards (RMS) outlined in the State Forest Land Management Plan (SFLMP) and site specific design recommendations of DNRC hydrologist and soil scientist would help minimize the potential impacts of the proposed action on the cold water fisheries in the affected streams.

Operations conducted near draw features or stream channels and on steeper slopes have a higher risk of impacting water quality. Chapter II – C.1. "Mitigation Measures Common To All Action Alternatives" includes measures that would help minimize risk of impacts during the proposed activities. These mitigation measures are standard practices that may be applied to all harvest activities associated with the proposed Moore Gulch Timber Sale. Recommended site-specific, contract design mitigation will be provided following the selection of an alternative.

4. Effects on Soils

The No-action alternative A would have some continued effects on soil resources. Existing range roads with inadequate drainage would continue to erode without maintenance and continued 4x4 road use. Sedimentation is a soil-related effect, which is discussed in the hydrology section.

For the Action Alternatives, the primary soil concerns are potential displacement and erosion associated with road construction and harvest operations. Potential site impacts are difficulty with regeneration, reduced site productivity and increased runoff and erosion. Susceptibility to impact varies with soils type, harvest method, type of equipment and season of use.

An extensive field review was conducted across the project area. Most sensitive soils are wet sites and steep slopes which would be avoided or protected through implementation of BMP'S and mitigation measures of Soil Scientist and Hydrologist to maintain productivity and protect soil and water resources. Under all action alternatives the harvest effects would be similar on a per acre basis and limit severe impacts to less than 15% of the proposed harvest areas. Tractor skidding would be limited to acceptable slopes of less than 40%. Skid trail planning will further limit the area of disturbance and damage to the residual stand and soils.

For all action alternatives, new roads would have adequate road drainage installed and would be stabilized by grass seeding. Road obliteration would not be needed on State land. Slash or physical closures would be installed to prevent road use by vehicles and off-road vehicles. The type and location of road closures on access roads across adjacent ownerships would depend on R/W permit requirements.

Alternatives C & E would have similar area of soil effects on the proposed 45 acres of harvest area. Alternative C would construct an access road across USFS lands on a stabile location that does not cross surface water. Alternative E would construct slightly more length of road (<.2 miles) to improve road grade and avoid an erosion problem on an existing 4 X 4 access road in BLM section 17. Road construction would involve minimal, balanced excavation on moderate slopes through the private and BLM ownership.

Alternatives B and D would have similar area of soil effects on the proposed 75 acres of harvest area, about 30 acres more than alternative C & E and slightly more road within State ownership to access units 5, 6 & 7. Alternative D would construct slightly more length of road (<0.2 miles)

than alternative B and similar to Alternative C.

Cumulative effects to soil productivity:

Cumulative effects could occur from repeated from entries into the harvest area. There are spots of old selective harvest, associated with past mining. Short trail segments are revegetated and have recovered. A proportion of large woody debris would be retained to sustain nutrient cycling and long term productivity.

Planned skidding and slash disposal mitigation measures would limit the area impacted and therefore presents low risk of cumulative effects to soils, assuming future stand entries would likely use existing trails and landings.

Chapter II – C.1. "Mitigation Measures Common To All Action Alternatives" includes measures that would help minimize risk of impacts to soils during the proposed activities. These mitigation measures are standard practices that may be applied to all harvest activities associated with the proposed Moore Gulch Timber Sale. Recommended site-specific, contract design mitigation measure would be provided following the selection of an alternative.

D. Big Game Winter Range, Elk Security and Vulnerability

1. Effects on Big Game Winter Range:

Alternative A - No Action

Under this alternative cover in section 16 would not be dramatically altered over the short-term. Existing stands would continue to provide good thermal cover for elk and deer. Stands that currently provide good cover would become increasingly susceptible to insect attacks and high attrition caused by lethal wildfires. Disturbances such as these at large scales could have adverse effects on wintering elk and deer should available cover become limiting along foothill-fringe habitats.

All Action Alternatives

Under Alternatives B and D about 135 acres would be maintained in patches and timbered stringers with moderate to heavy forest canopy.

Retained patches would typically not be large or dense enough to substantially intercept snow and facilitate movements of elk and deer within the section or across ownership boundaries. Retention patches would have dense thickets of conifer regeneration scattered throughout them, which would maintain sites usable for thermal protection from high wind. Thermal and snow intercept properties of the 75 acres proposed for treatment under Alternatives B and D would be substantially reduced. Slash burning within harvest unit could serve to slightly improve foraging conditions for wintering ungulates for ~1-3 years following treatment. Management activities proposed under this alternative would have moderate adverse effects on winter range habitat within section 16. Effects would be similar for Alternatives C and E, however, about 165 acres would not be treated. Units 5, 6 and 7 offer good quality winter cover which would remain intact. These units collectively would function to provide a more usable cover patch of ~40 acres in the northerly portion of the section that would provide greater amounts of effective winter cover than that which would remain following harvest under Alternatives B and D. Elk and deer that winter in this area would undergo additional stress and possibly be displaced by any harvest activities that would occur in winter. Displacement would likely only occur during active logging or associated road construction activities.

2. Effects on Elk Security and Vulnerability

Alternative A - No Action:

Under this alternative, no immediate change from the present condition would occur. Elk hiding cover and access would remain essentially unchanged. Over time and in the absence of wildfires, conifer cover would continue to expand into non-forested grasslands, further increasing amounts of hiding cover. Selection of this alternative would provide the lowest risk of increasing elk vulnerability over the short term and over the long term (>20 years) in the absence of wildfires and other natural disturbance agents. Subsequently, hunter opportunity would have the least risk of being impacted under this alternative. Densely forested patches of mature trees that provide cover would be maintained in a condition that would have greater risk to loss should an intense fire burn through the area. Selection of this alternative would not be expected to increase or decrease levels of game damage that could occur on adjacent private lands during hunting season.

Alternatives B and D:

Under this alternative ~75 acres of timber harvest would occur within seven treatment areas (units 1-7). About 135 acres of existing forested habitat would remain untreated in section 16 at this time. Quality of cover that would remain post-treatment across the 135 acres would be similar to slightly lesser than that found within harvest units. Proposed treatments would be moderate to intensive, and most would remove ~76% of the existing timber volume. Overstory canopy closure would be removed by a similar amount. About 100% of the existing volume would be removed in harvest unit 2, which would resemble a 3-acre clearcut following treatment. Timbered stands occurring on these and other similar sites were historically distributed in a patchy, fragmented condition (Gruell 1983), and existing forested patches that would be treated would become increasingly fragmented (i.e.), smaller and more isolated). No cover capable of functioning as hiding cover would be retained within the units post-harvest. Hiding cover within harvest units would likely not recover in harvest units for ~30 years. Habitat that provides security for elk would not be treated under this alternative. However, proposed harvest would result in loss of hiding cover important for elk, which would result in a moderate increase in elk vulnerability in the immediate area. Loss of hiding cover associated with this alternative would be expected to result in minor cumulative increases in vulnerability. Increases in vulnerability and subsequent potential reduction in hunter opportunity would not be expected to be discernable at the Hunting District or Elk Management Unit (EMU) scales. However, any cumulative increases in elk vulnerability could further hinder DFWP efforts to meet their "first week <40% bull harvest" habitat management objective as described above (DFWP 1992). Elk using the project area at the time of road construction and active logging would be likely be displaced to other habitats with less disturbance for the duration of the activity. As security cover on the project area and surrounding parcels is limited, timber harvest associated with this project would not be expected to measurably increase or decrease levels of game damage that could occur on adjacent private lands during hunting season.

Within the 25,280-acre landscape analysis area, road density is presently about 1.8 miles per square mile (simple calculation). Road construction proposed under alternatives B and D would increase road density to ~1.9 miles per square mile. Should roads be obstructed and rendered unusable following use for harvest activities, the functional road density would remain at about 1.8 miles per square mile. Existing forested acres within the Analysis Area were estimated at ~4,417. About 1,423 acres of additional forest were harvested between 1984 and 1998. Following

harvest, the remaining acres of mature forest would be reduced to ~4,342 acres. Thus, areas presently non-forested, sparsely forested or young conifer regeneration would be increased to ~1,498 acres in the analysis area (considering this harvest and other harvest on public and private lands in the analysis area since 1984). None of these acres would be considered to provide or contribute to secure elk cover following harvest.

Alternatives C and E:

Under this alternative ~45 acres of timber harvest would occur within four treatment areas (units 1-4). About 165 acres of existing forested habitat would remain untreated in section 16. This untreated area is of similar or slightly higher quality than that found within the harvest units. Cover patches that would be left intact in units 5, 6, and 7 lie adjacent to other existing cover on USFS ownership to the north in section 9. Retaining these patches would contribute to greater effectiveness post harvest than that which would be expected under Action Alternatives B and D, however, cover would be reduced below levels that would remain under the No Action Alternative A. Timbered stands occurring on these and other similar sites were historically distributed in a patchy, fragmented condition (Gruell 1983), and existing forested patches that would be treated would become increasingly fragmented (ie., smaller and more isolated), albeit at lesser levels than under Alternative A. Proposed treatments would be moderate to intensive, and most would remove ~76% of the existing timber volume. Overstory canopy closure would be removed by a similar amount. About 100% of the existing volume would be removed in harvest unit 2, which would resemble a 3-acre clearcut following treatment. No cover capable of functioning as hiding cover would be retained within the units post-harvest. Hiding cover within harvest units would likely not recover in harvest units for ~30 years. Habitat that provides security for elk would not be treated under this alternative. However, proposed harvest would result in loss of hiding cover important for elk, which would result in a minor increase in elk vulnerability in this area. Loss of hiding cover associated with this alternative would be expected to cumulatively contribute to increases in elk vulnerability in the Tobacco Roots. Increases in vulnerability and subsequent potential reduction in hunter opportunity would not be expected to be discernable at the Hunting District or EMU scales. However, any cumulative increases in elk vulnerability could further hinder DFWP efforts to meet their "first week <40% bull harvest" habitat management objective as described above (DFWP 1992). Elk using the project area at the time of road construction and active logging would be likely be displaced to other habitats with less disturbance for the duration of the activity. As security cover on the project area and surrounding

parcels is limited, timber harvest associated with this project would not be expected to measurably increase or decrease levels of game damage that could occur on adjacent private lands during hunting season.

Within the 25,280-acre Landscape Analysis Area, road density is presently about 1.8 miles per square mile (simple calculation). Road construction proposed under these alternatives would increase road density to ~1.9 miles per square mile. Should roads be obstructed and rendered unusable following use for harvest activities, the functional road density following treatment would remain at about 1.8 miles per square mile. Existing forested acres within the Analysis Area were estimated at ~4,417. About 1,423 acres of additional forest were harvested between 1984 and 1998. Following harvest, the remaining acres of mature forest would be reduced to ~4,372 acres. Thus, areas presently non-forested, sparsely forested or young conifer regeneration would be increased to ~1,468 acres in the analysis area (considering other harvest on public and private lands in the analysis area since 1984). None of these acres would be considered to provide or contribute to secure elk cover following harvest.

3. Cumulative Effects:

Harvest proposed under Alternatives B & D (~75 acres) and C & E (~45 acres) would contribute cumulatively to reductions of mature forest cover that have occurred since ~1984, and those that could occur under the USFS Tobacco Root Vegetation Management Plan (USFS 1999). Harvesting of timber has also occurred on nearby private lands and could continue into the future. While the harvested acreages proposed are relatively small, they would cumulatively contribute to minor increases in elk vulnerability and reduced winter range effectiveness. Livestock grazing also occurs on section 16 and the surrounding parcels, however, measurable adverse effects associated with timber management and grazing in combination are not anticipated. Harvesting in section 16 in a manner that emulates natural disturbance processes would be expected to have a minor positive cumulative influence on ecosystem integrity on these sites that were sparsely forested under natural disturbance regimes. Minimal cumulative influences on access would be anticipated following road obliteration efforts that would occur in conjunction with either action alternative.

Forest Service activities in the area proposed under the Tobacco Root Vegetation Management Plan would contribute cumulative adverse consequences for elk. Under the preferred alternative (Alt "S"), ~588

acres would be harvested over a three year period in section 9, which lies immediately to the north. Approximately 100+ acres would also be harvested in USFS section 8, which lies immediately to the northwest of section 16. There would also be some harvest in section 4, which is due north of section 9. This additional harvest would have little effect on existing security cover, however, there would be a substantial reduction in elk hiding cover as thinning from below and underburning would reduce cover important for visual screening. The status of the USFS proposal is uncertain at this time.

DNRC has two possible road location scenarios for the Moore Gulch proposal. One would access harvest units from the north through USFS -- section 9. The second would access the units from the west through BLM and private land occurring in section 17. Both routes would require a similar amount of new construction (~3 miles). Open road densities are already high and cover capable of providing security is minimal in this area. No treatments would occur in stands on DNRC ownership that meet the Lyon and Christensen (1992) definition of security habitat. Consequently, security habitat for elk would not be affected measurably by either route. Both access routes, if left open following use, however, would increase elk vulnerability in the area. (See Table IV-6) The actual extent of increase is uncertain as many factors can influence vulnerability (e.g. size, extent and juxtaposition of security areas and migration corridors; type, structure, amount and density of vegetation; road density; ease of human accessibility, hunting pressure, hunting regulations, and hunter behavior, etc.) (DFWP 1992:8). Variations in weather conditions from year to year can also influence elk vulnerability. However, elk that might use this area would likely have a greater probability of being shot if either of these routes were to remain accessible following their use for this project. Thus, an increase in vulnerability would occur. By implementing mitigation efforts such as recontouring the road surface, seeding it and scattering root-wads and slash across it foot or motor vehicle use on either of these routes would dramatically decrease. An expected "no effect" post treatment can result from such efforts if travel on a newly constructed road is made as difficult, or more difficult to negotiate than adjacent unroaded areas

TABLE IV – 6– Relative Effects of Proposed DNRC and USFS Actions on Elk Vulnerability

Ownership(s) Harvested *	Access Route	Relative Elk Vulnerability Risk Level #
No Harvest USFS No Harvest DNRC – Alt. A	No Change From Existing	No Increase
No Harvest USFS DNRC Harvest Alt. E	West w/recontour or rip-slash mitigation	Low Increase
No Harvest USFS DNRC Harvest Alt. C	North w/recontour or rip-slash mitigation	Low Increase
No Harvest USFS DNRC Harvest Alt. D	West w/recontour or rip-slash mitigation	Low to Moderate Increase
No Harvest USFS DNRC Harvest Action B	North w/recontour or rip-slash mitigation	Low to Moderate Increase
Harvest on USFS No Harvest DNRC – Alt. A	N/A	Moderate Increase
Harvest on USFS DNRC Harvest Alt. E	West w/recontour or rip-slash mitigation	Moderate to High Increase
Harvest on USFS DNRC Harvest Alt. C	North w/recontour or rip-slash mitigation	Moderate to High Increase
Harvest on USFS DNRC Harvest Alt. D	West w/recontour or rip-slash mitigation	High Increase
Harvest on USFS DNRC Harvest Alt. B	North w/recontour or rip-slash mitigation	High Increase

* "Harvest on USFS" considers the potential effects of the USFS Tobacco Root Vegetation Treatment DEIS preferred Alternative "S," within sections 4, 8, and 9 to the north (USFS 1999). "DNRC Harvest" considers the added effects of the four Moore Gulch Timber Sale action alternatives.

While relative elk vulnerability risk varies from the existing condition, no treatments would occur in stands on DNRC ownership that meet the Lyon and Christensen (1992) definition of security habitat. Thus, security cover would be minimally influenced, should any of the action alternatives be selected.

E. Threatened, Endangered and Sensitive Species

To display and address the issues of T & E and Sensitive Species the following Fine Filter Wildlife Checklist for the Central Land Office is presented.

Boreal Owl (*Aegolius funereus*) Habitat: mature to late-successional forest >5,200 ft. elev.	[N] The project area lies at about 6,600 feet in elevation, which is within the elevational range frequently used by boreal owls. However, cool, spruce-fir habitats normally used by borealS do not occur within the project area. Dry Douglas-fir and lodgepole stands found within the project area are likely too warm and limited structurally to provide adequate habitat for boreal owls. No direct or cumulative impacts to boreal owls would be expected to occur as a result of this project.
Black-Backed Woodpecker (*Picoides arcticus*) Habitat: mature to old burned or beetle-infested forest	[Y] Black-backed woodpeckers have been documented within the latilong that encompasses the project area (Skaar 1996), and are known to occur in the Tobacco Root Mountains (USFS 1999). Stands found within the project area are not presently experiencing substantial insect activity, and no recent burns occur within the section. Thus, foraging and nesting opportunities are presently limited in the project area. Harvest activities associated with this project would reduce the density of existing mature stands that are becoming increasingly prone to insects and intense fire events. Thus, reduced tree density would result in a minor cumulative decrease in the acreage of future, potential black-backed woodpecker habitat.
Pileated Woodpecker (*Dryocopus pileatus*) Habitat: late-successional ponderosa pine and larch-fir forest	[N] Pileated woodpeckers have not been reported for the latilong that encompasses the project area (Skaar 1996). The project area is poorly suited for use by pileated woodpeckers. No direct or cumulative impacts to pileated woodpeckers would be expected to occur as a result of this project.
Northern Bog Lemming (*Synaptomys borealis*) Habitat: sphagnum meadows, bogs, fens with thick moss mats	[N] No sphagnum meadows or bogs occur in the project area. No direct or cumulative impacts to bog lemmings would be expected to occur as a result of this project.
Peregrine Falcon (*Falco peregrinus*) Habitat: cliff features near open foraging areas and/or wetlands	[N] No extensive cliff features or suitable foraging areas occur within 1 mile of the project area. No direct or cumulative effects associated with this project are anticipated.
Harlequin Duck (*Histrionicus histrionicus*) Habitat: white-water streams, boulder and cobble substrates	[N] No streams suitable for use by harlequins occur within the project area or along proposed haul routes. No direct or cumulative mpacts to harlequin ducks would be expected to occur as a result of this project.

Ferruginous Hawk (*Buteo regalis*) Habitat: prairies and badlands	[N] Breeding ferruginous hawks have been documented within the latilong that encompasses the project area. However, badland habitats and areas with small buttes and bluffs that are preferred nesting sites do not occur in the project area, or within one mile of the project area. However, ferruginous hawks may occasionally move through the vicinity or potentially nest in nearby grasslands. No direct or cumulative impacts to ferruginous hawks are expected to occur as a result of this project, however, should any ground-nesting hawks be observed within 400 meters of proposed haul routes or active harvest units, harvest activities would cease and a DNRC biologist would be contacted immediately. Site-specific mitigations would then be designed to protect the nest site if nesting ferruginous hawks are detected.
Mountain Plover (*Charadrius montanus*) Habitat: short-grass prairie, alkaline flats, prairie dog towns	[N] No short-grass prairie or prairie dog towns occur on, or within one mile of the project area. No direct or cumulative impacts to mountain plovers are expected as a result of this project.
Townsend's Big-Eared Bat (*Plecotus townsendii*) Habitat: caves, caverns, old mines, large-hollow snags	[N] No caves, caverns or old mines suitable for use by Townsend's big-eared bats are known to occur in the project area or along proposed haul routes. Thus, neither direct or cumulative impacts to Townsend's big-eared bats are not expected to occur as a result of this project.